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Professional Standards

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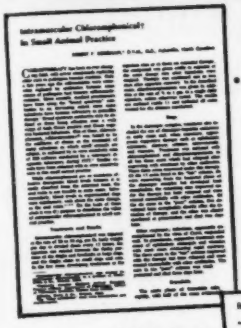

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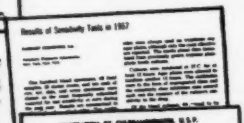

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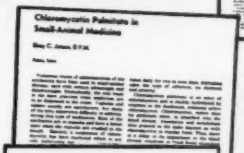

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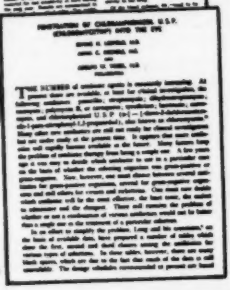

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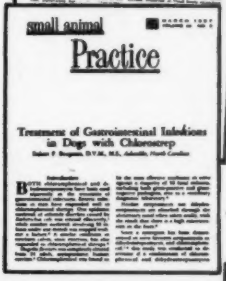

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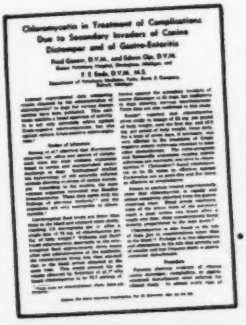

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by Fred Gasow, D.V.M., Edwin Oja, D.V.M. and F. E. Eads, D.V.M., M.S.
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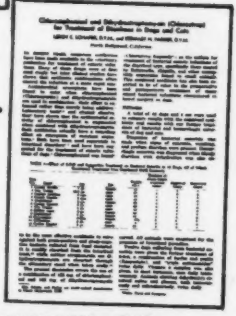

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ULTRACORTENOL has been extensively tested and enthusiastically accepted by a number of small- and large-animal practitioners[1-10] who found these regimens to be highly effective:

Dairy Cow	Ketosis (acetonemia)	Single 100- to 200-mg. injection*
	Shock ("downer" cow) syndrome	Single 200-mg. injection as supportive therapy.
Dog	Dermatoses	5 mg./10 pounds body weight, total single dose not to exceed 20 mg. For sustained therapy, repeat once or twice a week as indicated.
	Inflammatory joint conditions	5 mg./10 pounds body weight, total single dose not to exceed 20 mg. Supportive oral therapy not necessary.

*This initial injection may be reduced to 50 to 100 mg. intramuscularly if simultaneous administration of intravenous glucose is given, thus permitting more economical glucocorticoid therapy. If necessary, either regimen may be augmented by an additional injection of 50 to 100 mg. Ultracortenol after 24 to 48 hours.

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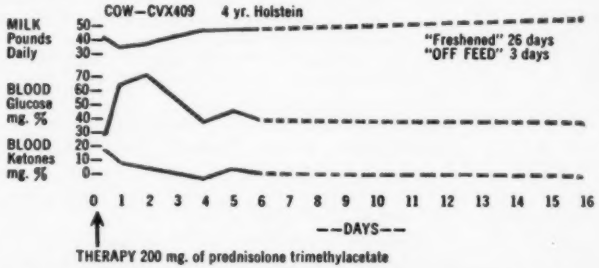
New injectable glucocorticoid

BOVINE KETOSIS Following a single intramuscular injection of Ultracortenol, investigators observe that:

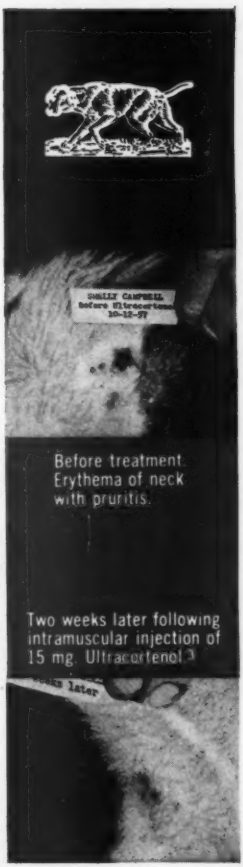
- appetite is restored, depression is dispelled within 12 to 24 hours[1]
- blood glucose levels are raised within 12 hours[1]
- blood ketone levels return to normal within 24 to 96 hours[1]
- a steady increase in milk production begins after 48 hours.[2]



This chart shows the good response in ketotic cow following intramuscular injection of 200 mg. of Ultracortenol.

(Adapted from Vigue[1])

CANINE DERMATOSES Reporting on 9 animals (of whom 6 received 15 or 20 mg. Ultracortenol in a **single** intramuscular dose), Pollock[3] says, ". . . Ultracorten Trimethylacetate [Ultracortenol] proved effective not only against the seemingly innocuous lesions, but also against the hemorrhagic dermatitis associated with exquisite pain." And, "The duration of the anti-inflammatory phase varies from seven to ten days depending upon the dosage. . . ."[3]



Before treatment. Erythema of neck with pruritis.

Two weeks later following intramuscular injection of 15 mg. Ultracortenol.[3]

References: 1. Vigue, R. F.: J.A.V.M.A. 133:326 (Sept. 15) 1958. 2. Shaw, J. C.: Personal communication. 3. Pollock, S.: To be published. 4. Rabin, P. H.: Personal communication. 5. Hoffer, S. H.: Personal communication. 6. Weir, H. T., and Hazelrig, J. W.: Personal communication. 7. Beck, J. W.: Personal communication. 8. Bull, W. S.: Personal communication. 9. Fessenden, P. E.: Personal communication. 10. Lohmeyer, C.: Personal communication.

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Antibody Response of the Bovine Udder . . 1

I. D. PORTERFIELD, Ph.D., W. E. PETERSEN, Ph.D., D.Sc., and BERRY CAMPBELL, Ph.D.

The antibody producing capacity of the cow's udder presents great potential for practical application by the dairy industry. This study answers some important questions on antibody response to antigens introduced systemically or directly into the udder.

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Recent Studies on the Properties of a Nonvirulent Living Hog Cholera Vaccine . 41

J. W. NEWBERNE, D.V.M., M.S., R. V. JOHNSTON, D.V.M., V. B. ROBINSON, D.V.M., Ph.D., C. J. YORK, D.V.M., Ph.D., and E. F. SANDERS, D.V.M.

The writers present a resume of experimental and field data obtained during development and refinement of a modified, living virus hog cholera vaccine. Evidence accumulated indicates that this living virus is nonvirulent, albeit retaining the highly antigenic properties of the original unmodified strain.

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MANAGEMENT OF LACTATION KETOSIS

R. F. Vigue D.V.M., W. H. Fitzgerald, B.S., and R. F. Castrucci, B.S.

The first consideration in management of clinical ketosis is determination of the cause of negative energy balance. The writers discuss discovery and correction of the primary offending condition as well as symptomatic therapy.

GERIATRICS OF SMALL ANIMALS

F. D. Gentry, D.V.M.

The care of aged pets is becoming a growing consideration in small animal practice. The writer discusses not only physiological aging with attention to compensation rather than cure, but also pathological aging and therapy that can cure or serve as prophylactic measures.

DWARF BULLS

John M. Delphia, M.S., D. F. Eveleth, Ph.D., D.V.M., F. M. Bolin, D.V.M. and M. L. Buchanan, M.S.

In this case report, the writers present a study of certain endocrine glands from two sterile Hereford dwarf bulls.

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*Groups 1 to 4 travelled 18 hours by truck. Groups 5 and 6 travelled 17 hours by truck.

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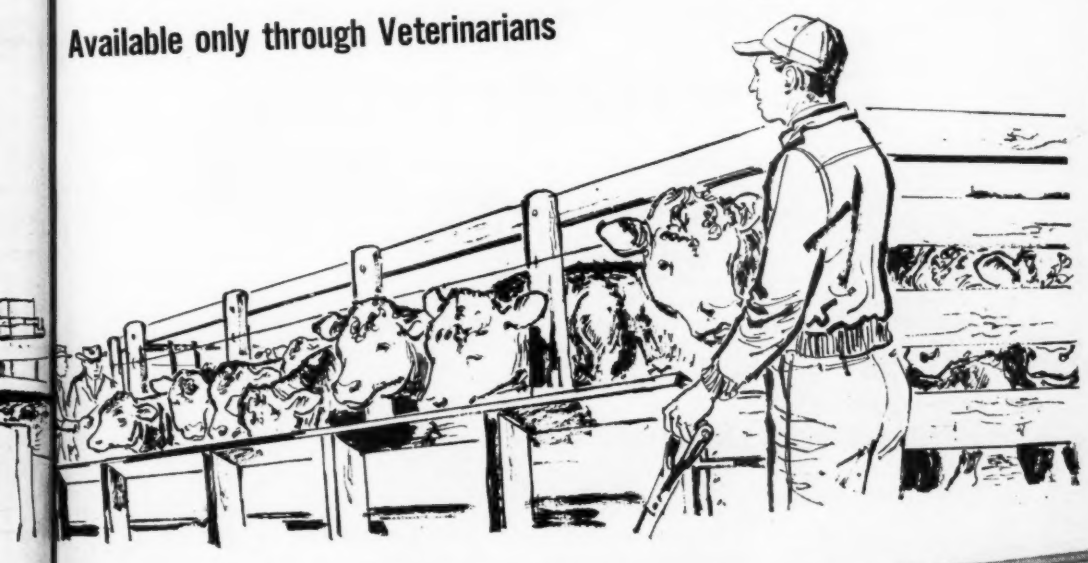

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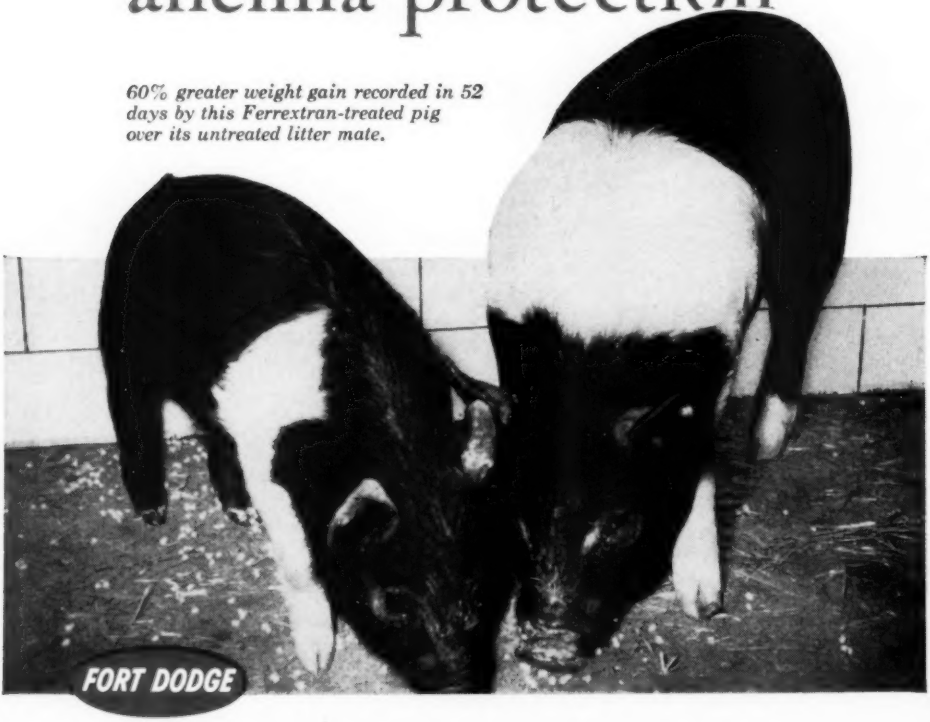

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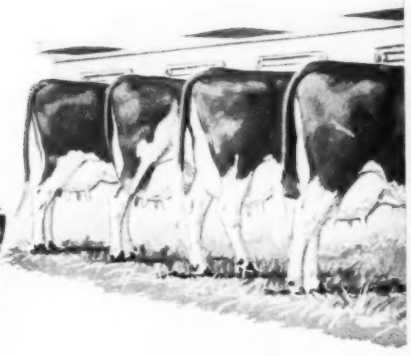

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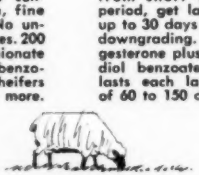

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*Belloff, G. B.: Calif. Vet. *9*:16 (Nov.-Dec.) 1956.

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*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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REFERENCES: 1. Bull, W. S.: N. Amer. Vet., In press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., In press.

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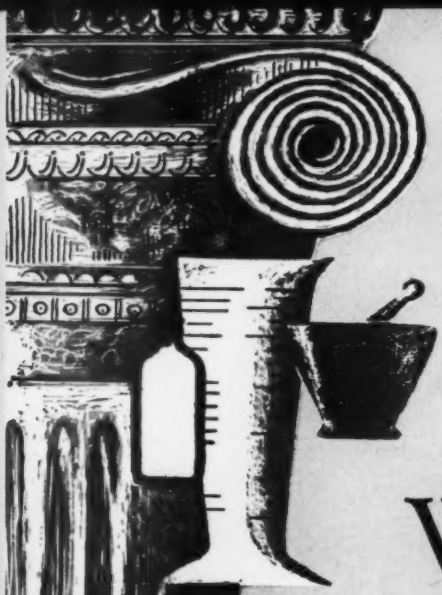

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News Comment

Canine Serum Samples

The diagnostic laboratory at Cornell University is now accepting canine serum samples on a routine basis for determination of distemper antibody levels. Based on the established knowledge that passive immunity interferes with active distemper immunization of puppies, valuable time can be saved by determining the antibody titer of the bitch before whelping. Vaccination can be successfully conducted at an early age if maternal antibody levels are low. In a similar manner, vaccination efficacy can be checked three to four weeks later by this new diagnostic service.

To Continue Veterinary Corps

The order to abolish the veterinary functions of the Army and Air Force has been rescinded by Secretary of Defense Neil H. McElroy. The 1957 directive by Defense Secretary Wilson drew fire from the profession and others interested in public health problems in the service. Effective in their opposition to the original Wilson order were Representative Carl Vinson, chairman of the House Armed Services Committee, and the many other Senators and Congressmen, who opposed the move.

Stress Ameliorating Drug

A potent stress ameliorating drug has been cleared for sale as an animal feed additive by the Canadian Food and Drug Directorate. The new additive reserpine (Serpasil Ciba), is not yet commercially available. The drug, a single pure crystalline alkaloid of rauwolfia root, has been available in the United States and Canada as an oral tranquilizer for the past two years.

Radioactive Food

A significant increase in the radioactivity of some sea foods, dairy products, and tea has been noted since the advent of the atomic age. Evidence was assembled by the Food and Drug Administration by comparing pre-1945 food —

some of which had been buried in Antarctica in 1906 — with food processed recently. Tea exhibited a thirty-fold increase in radioactivity. Some samples were between 109 and 135 times as radioactive. However, tolerable limits have not been exceeded.

Vibriosis

Research at the University of Idaho branch experiment station, Caldwell, suggests the benefits of treating ewes to prevent outbreaks of vibriosis. Antibiotic injections or antibiotic feeding, or a combination of the two, have been calculated to be of value in saving pregnancies. Dosages and interval between treatment with the various antibiotics are still the subject of research, according to Dr. Floyd W. Frank, who is conducting the experiments.

Antibiotic Effective in Malignancy

A powerful new antibiotic, mitomycin C, has been reported by Japanese scientists to be an effective anti-tumor agent. Used to prevent recurrence of malignancy following surgery, and in treating patients when neoplasms were so far advanced that surgery was either impossible or merely palliative, the drug effected "immediate improvement" in almost all patients, and tumor regression in almost one-third. Preliminary clinical trials are being conducted in the United States under auspices of the National Cancer Institute.

Bone Transplants

Bovine bone transplants in 50 human patients, either as ground-up paste or intact sections of bovine rib have given "initial, encouraging results," according to Drs. Nicholas G. Georgiade and Kenneth Pickrell of Duke University. Follow-up of implant cases has revealed no evidence of resportion or loss of contour. Solid bone grafts result in clinical union to adjacent bone. Paste applications have helped speed healing of post-trephine skull defects, mandibular fractures, alveolar-cleft and post-traumatic facial deformities.

Vertical Integration

Sweeping changes in veterinary practice have been predicted by Dr. Hilmer Jones, speaking before the 45th annual meeting of the Eastern Iowa Veterinary Association recently. Changes, he indicated, will come as a result of vertical integration.

"Whereas the main activities of the farm practitioner are today largely devoted to curing the sick animals and administering prophylactics, they will be devoted in the future to increasing fertility, preventing disease, and developing more efficient feeding procedures."

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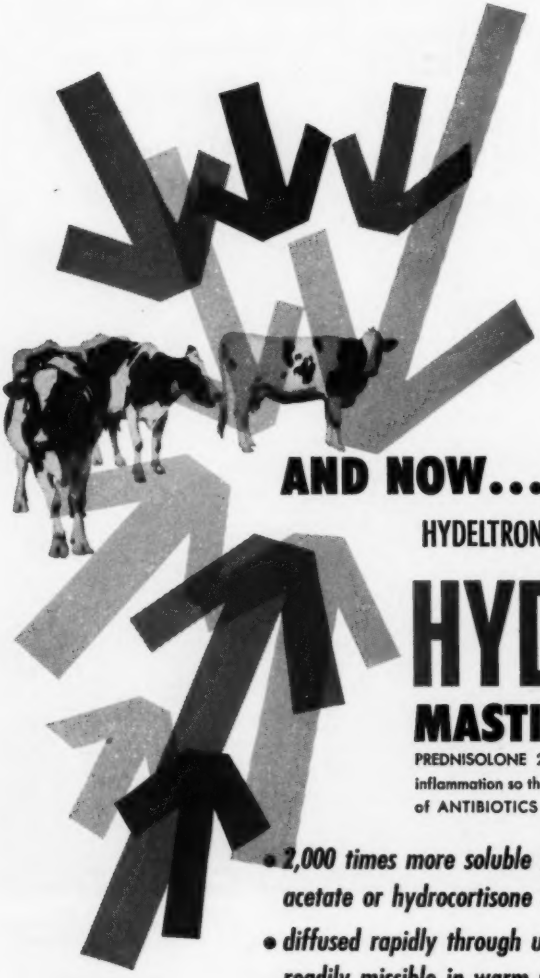

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The antibody producing capacity of the cow's udder has attracted widespread interest. Great possibilities for practical application by the dairy industry intrigue scientists, dairymen and economists. This study presents answers to some of the many questions raised about antibody response to antigens introduced systemically or directly into the cow's mammary gland.

Antibody Response of the Bovine Udder

I. D. PORTERFIELD, Ph.D., W. E. PETERSEN, Ph.D., D.Sc. and BERRY CAMPBELL, Ph.D.

Departments of Dairy Husbandry and Anatomy
University of Minnesota
St. Paul, Minnesota

SINCE EHRLICH'S REPORT IN 1892* it has been known that certain immunities can be conferred by the mother to her young through her milk. The importance of colostrum milk as a protection to the calf was well demonstrated by Smith and Little[8] in 1922. Since then, others have shown the importance of colostrum milk for the protection of the young ungulates whose blood is devoid of gamma globulin and antibodies at birth.

Since the reports of Campbell *et. al.*[1] and Porter[7] showing that the histological basis of local antibody production may be seen in the parturient udder[3] the subsequent report by Petersen and Campbell[6] that antibodies in milk are absorbed from the gastrointestinal tract in at least ten species of animals, new interest has developed in the possibility of making use of the antibody producing capacity of the cow's udder. The study herein reported deals with experiments designed to obtain answers to some of the many questions raised about antibody response to antigens introduced systemically or directly into the cow's mammary gland. Specifically, this study attempts to shed further light on the formation of antibodies in the bovine mammary gland; on the speed of response in the udder to locally introduced antigens; and on the effect of varying methods of introducing the antigen, such as intramammary and systemic, upon antibody content of the milk. In addition, data were collected on the booster effect of repeated administration of the antigen by the various routes and its effect upon the health of the animal and the mammary gland, and finally the rate of disappearance of the antibody from both milk and blood.

Methods and Materials

Registered Jerseys and grade cows from the milking herd of the University of Minnesota were treated with phenolized antigen

Paper no. 3939, Scientific Journal Series, Minnesota Agricultural Experiment Station. The data for this paper are taken from a thesis presented by I. D. Porterfield in partial fulfillment of the requirements for the Ph.D. degree, December 1956.

Present address of Doctor Porterfield: Department of Dairy Husbandry, West Virginia University, Morgantown, West Virginia.

*Doctor Campbell has examined material described by Dixon (Fed. Proc., 1958, p. 509) and finds plasmacytosis exactly as described by Campbell, Porter and Petersen.

standardized to 40 to 80 x 10^{10} cells per milliliter. Only cows initially showing negative titers in their blood serum and milk (if lactating) were used. The antigen was administered in one of three ways: (1) by subcutaneous injections made in the neck, or (2) by intramuscular injections made in the rump near the thurls, and (3) by intramammary infusions made through the teat meatus with a syringe and teat cannula. Prior to the infusion, a solution of 400,000 units of penicillin and one gram of streptomycin was introduced into the udder as a prophylactic measure.

An assay for antibodies was made on the whole milk and the clear blood serum of all experimental animals, before treatment and at frequent intervals after the antigen had been administered. The assay was done by plate agglutination using the same vaccine and examining for agglutination at 1:10, 1:100, 1:1000 and 1:10,000 dilutions with physiological saline solution.

After the infusions, mammary glands were palpated for evidence of inflammatory reactions and the milk was also subjected to the modified Whiteside test, which is a measure of irritation in the udder. In this test, five drops of the milk was mixed on a glass plate with one drop of 4% sodium hydroxide solution.

Results and Discussion

Infusion of the Dry Udder. Several workers, Cooledge,[3] Giltner *et al.*,[4] Smith *et al.*[6] and Porter,[7] have shown that active mammary glands produce antibodies against certain antigens, and two of these, Giltner *et al.* and Smith *et al.*, proposed without explanation that antibodies were produced locally in the cow's udder. In the study presented here, the effect of the infusion of an antigen into the udder was studied.

Table 1 gives data on the titer of the blood and colostrum at the time of parturition on seven cows whose udders were infused during the dry period with varying amounts of antigen. A study of the table reveals that the antibody titer of the colostrum is usually higher than that of the blood serum at the time of parturition.

It was found that as lactation advanced there was a gradual reduction in the antibody content of the milk whereas that in the blood serum remained fairly constant. This is consistent with the histological findings previously referred to. Similar decline in the milk antibody level has been reported by Mitchell *et al.* following immunization of the udder with Newcastle's virus and other agents.[5]

Infusion of the Lactating Udder. Additional data are presented in table 2 obtained from three cows that were infused with the antigen into one or two quarters of the udder during lactation. The initial response shows the infused quarter to be much higher in antibody content than the blood serum. It can also be noted that antibodies appeared in the uninfused quarters four days after the initial infusion. These results are in agreement with those obtained by Cooledge[3] by Giltner *et al.*,[4] by Smith and co-workers[6] and by Mitchell *et al.*[5] These facts are adjudged by us to be unequivocal proof of local antibody production in the mammary gland.

The Speed of Response. To determine how quickly the udder will respond to the infusion of antigen, the four quarters of the udder of two lactating cows were each infused with 4 ml. of the antigen suspended

TABLE 1. The Effect of Intramammary Infusions of *Salmonella pullorum* Antigen in Varying Quantities and Frequencies During the Dry Period Upon Agglutination Titers of Colostrum and Blood

Cow No.	Antigen Used per Quarter per Infusion (ml.)	No. Infusions	Days Between Infusions	Titer	
				Colostrum	Blood Serum
M-380	1.0	5	7	1:10,000	1:1000
T-103	.00625-1.0	15	3	1:10,000	1:1000
T-24	1.0	5	7	1:1000	1:1000
T-25	1.0	6	7	1:10,000	1:1000
T-26	1.0	4	7	1:10,000	1:100
M-378	.5	5	7	1:1000	1:1000
T-143	2.0	5	7	1:10,000	1:1000

in 16 ml. of distilled water. One hour after the infusion 1 ml. of oxytocin was administered intravenously so that the contents of the udder (milk and antigen) could be completely removed. The antibody titer of the milk and blood serum following the above treatment is shown in table 3.

Giltner *et al.*[4] reported that antibodies were detected in milk the day following the infusion of the antigen. Smith *et al.*[9] reported a response in milk within two days following the infusion. However, in the experiment herein described (table 3), a pronounced response in the milk was given two hours after the infusion of the udder, but only a slight response was given in the blood serum 24 hours later. It is clearly demonstrated that the bovine mammary gland is capable of producing large quantities of antibodies, as is evidenced by the response to the infused antigen.

Intramuscular and Subcutaneous Injections. Table 4 contains data obtained from three cows: one that received one intramuscular injection, and two, each of which received one intramuscular and four subcutaneous injections of varying amounts at seven day intervals. In comparing the titer of the colostrum and blood obtained from these three cows with that obtained from the seven cows infused by the intramammary route (table 1), it is apparent that the antibody content of the colostrum was higher from the cows infused through the teat canal.

Booster Shots. To determine if there was a difference in booster response to the antigen administered intramuscularly and by intramammary infusion, eight cows which were already producing antibodies against the antigen were given booster shots by the two different ways. Data comparing the two methods of administration are contained in table 5. It is noted that the first four cows listed were administered the bacterin via intramuscular route, whereas the last four received intramammary infusions. In comparing the booster effect of the two methods, it is readily apparent that the response obtained from intramammary infusions was the more rapid and the titer of the milk was higher than with the intramuscular injections.

TABLE 3. The Speed of Response to One Intramammary Infusion of the Antigen into all Quarters During Lactation

Hours after Infusion	Cow No. M-359 Agglutination Titer		Cow No. T-110 Agglutination Titer	
	Milk	Blood serum	Milk	Blood serum
0	0	0	0	0
1	0	0	0	0
2	1:100	0	1:10	0
3	1:100	0	1:100	0
4	1:100	0	1:1000	0
5	1:100	0	1:1000	0
6	1:100	0	1:1000	0
7	1:100	0	1:1000	0
8	1:100	0	1:1000	0
9	1:100	0	1:1000	0
24	1:100	1:1	1:1000	1:10
48	1:100	1:10	1:1000	1:10
72	1:10	1:10	1:100	1:10

Persistence of Antibody Production. In order to determine the persistence in antibody production, the antibody titer of both the milk and blood serum from four cows that had intramammary infusions while dry was determined at weekly intervals over a period of 246-288 days. Figure 1 shows the titer of the milk and blood for one typical cow for 41 weeks. It is readily apparent that the titer of both the milk and blood serum showed considerable fluctuation during the 41 weeks, but the level of both remained high. These findings are in agreement with Mitchell *et al.*[5] who, using live virus as an antigen, reported that the bovine mammary gland was producing antibodies 18 months after being infused.

Health of Cows Used in This Study. All animals that received intramammary infusions of the antigen while dry showed no marked systemic reaction to the antigen

TABLE 2. The Response to Intrammary Infusion of *Salmonella pullorum* Antigen into One or More Quarters During Lactation

Cow No.	Amount and Quarter Infused	Agglutination Titer Next Day Milk	Blood Serum	No. of days for titer to develop in Other Quarters	Blood Serum
T-64	2 ml. R.F.	1:1000	1:10	4	1
T-157	2 ml. R.F.	1:1000	1:10	4	1
T-120	5 ml. R.F. and L.F.	1:100	Not determined	4	Not determined

TABLE 4. Effect of Systemic Administration of *Salmonella pullorum* Antigen During the Dry Period upon Agglutination Titers of Colostrum and Blood

Cow No.	Treatment	Titer		Remarks
		Colostrum	Blood	
T-132	5 ml. intramuscular 4 days before calving	1:100	1:10	Marked systemic reaction after intramuscular injection
T-126	2 ml. intramuscular then at 7-day intervals 0.5, 1.0, 1.5 and 1.5 ml. subcutaneous	1:100	1:100	"
T-142	2 ml. intramuscular then at 7-day intervals four 2 ml. subcutaneous	1:1000	1:1000	"

immediately following the infusion or after calving. Typical reactions to intramammary infusions made during lactation were: (1) elevation in body temperature from two to four degrees, (2) complete letdown of milk in infused quarters within three hours, (3) positive reaction to the Whiteside test for four days after infusion, and (4) approximately a 50% drop in milk production the first day after infusion with a return to normal within five days.

All cows (dry and lactating) that received intramuscular injections of the antigen showed pronounced systemic reactions three to four hours after the injections. Typical of the reactions was an elevation in body temperature of two to four degrees, labored breathing and bloating.

Summary and Conclusions

On the basis of these findings, it would appear that there are in the bovine two antibody-producing mechanisms; namely, the mammary gland and the systemic reticuloendothelial system. It would appear that the mammary gland possesses an antibody producing system capable of rapid, copious production of antibodies to specific antigens. This is not unrelated to the reticuloendothelial system of the body for antibodies pass from the gland to the blood stream when the gland is stimulated[6] and similarly antibodies pass from the blood stream to the gland.[3] The stimulation of the gland during the dry period resulted in a higher antibody content in the milk than in the blood serum at time of parturition. However, as lactation advances, the milk drops below the blood in antibody content. Reasons for this may be (1) the constant removal of antibodies from the mammary gland in the milking process (2) the reduction of local immunity in the gland.

On the basis of the findings herein reported, the following results are indicated:

Continued on page 11

TABLE 5. Effect of Booster Administration of *Salmonella pullorum* Antigen Upon Agglutination Titers of Milk and Blood

Cow No.	Previous Treatment	Booster Treatment	Titer Before Treatment			Titer After Treatment		
			Milk	Blood	Time	Milk	Time	Blood
T-103	Intramammary while dry	5—5 ml. injections of antigen intramuscular	1:100	1:1000	24 hr.	1:100	24 hr.	1:1000
T-24	"	1—5 ml. injections of antigen intramuscular	1:10	1:100	20 days	1:100	20 days	1:1000
T-25	"	"	1:10	1:100	"	"	"	"
T-26	"	"	"	"	"	"	"	"
T-132	Intramuscular while dry	1 ml. antigen intramammary (1 quarter)	1:10	1:100	5 hr.	1:1000	10 days	1:10,000
T-103	Intramammary while dry	" (front quarters)	1:100	1:100	7 hr.	1:1000	8 days	1:1000
T-4	Intramammary while lactating	" (1 quarter)	1:100	1:10	6 hr.	1:1000	6 days	1:100
T-143	Intramammary while dry	" (1 quarter)	1:100	1:10	9 hr.	1:1000	24 hr.	1:100

Fig. 1. Remarks by Governor George Docking highlighted the ribbon cutting ceremonies at the Kansas State College annual Veterinary Medicine Open House. Shown left to right are Dr. M. L. Hendrickson, Dean E. E. Leasure, Governor George Docking and Andy Stewart.

Open House

At Kansas State College

School of Veterinary Medicine

SEVERAL THOUSAND GUESTS made their way studiously through the second annual Veterinary Medicine Open House at Kansas State College, October 25, 1958. Representing countless hours of planning and preparation, the quality and excellance of this exhibition was profoundly impressive to professional and lay visitors.

During the several hours required for guests to view the many exhibits, all visitors had the opportunity to see first hand the fine facilities and equipment of the veterinary school in action.

Opening ceremonies saw Governor George cut the ribbon at Veterinary Hall, officially opening the exhibition route. Visitors were briefed on the various phase of veterinary education in the main hall before moving along to Burt Hall, where they saw detailed exhibits depicting the basic science curriculum. The tour ended in the new Dykstra hospital.

All phases of clinical training including surgical technics, diagnostic methods, were demonstrated for visitors. Dog shows scheduled throughout the day and a five month old African lion cub attracted the attention of the youngest visitors. Veterinary students patiently and carefully answered questions along the entire Open House route. Special attractions such as rumen fistula studies, visual demonstration of respiration, cardiac and rumen function with the new Poly-Viso machine and special radiographic technics and radio-isotope applications in veterinary medicine prompted many questions from lay visitors.

In presenting this outstanding public relations contribution to the profession, students brought into play both ingenuity and scholarship to give their future clients a better understanding of the role veterinarians play in daily practice. Veterinarians can be proud of the high caliber young men filling the ranks of the profession and the educational background they bring with them.

All photographs courtesy of Dr. Robert Barrett.

Fig. 2. Among those attending Open House were Governor George Docking, Secretary to the Governor Sullivan, and Kansas State College President James A. McCain.

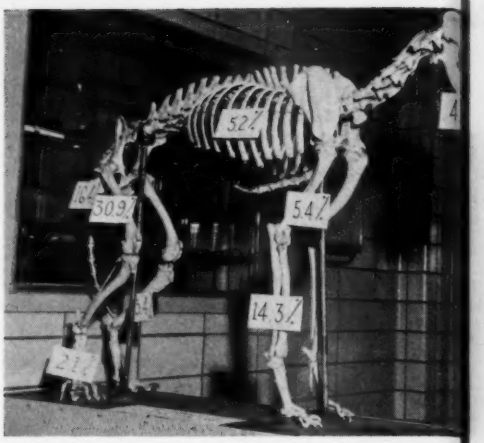


Fig. 5. Skeleton with tags depicting percentage of bone fracture locations in the dog.

Open House

Fig. 3. Shown here are students making preparations for the elaborate Open House.

Fig. 4. On hand to attract the attention of passing visitors was expensive research equipment used in veterinary medicine.

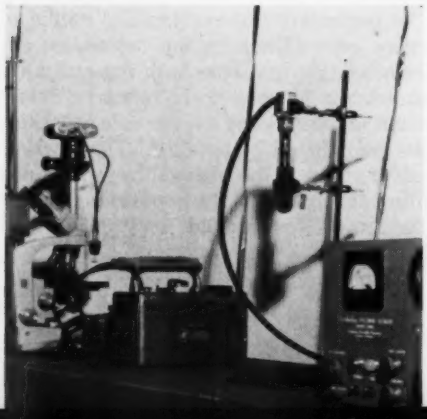
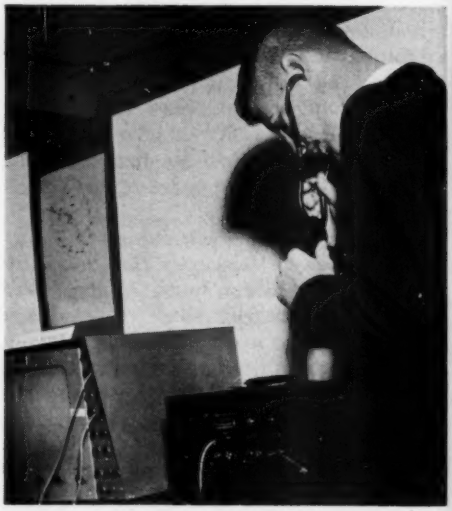


Fig. 6. Student demonstrating Poly-Viso machine with which cardiac and rumen function can be visually demonstrated.



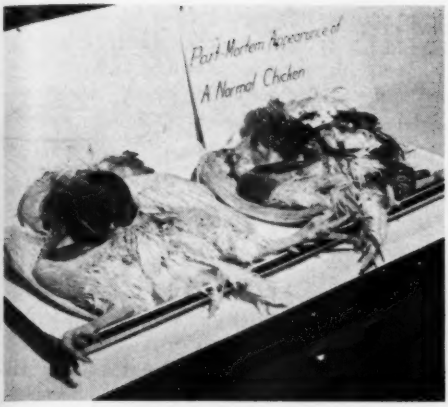


Fig. 7. Display illustrating the postmortem appearance of a chicken.

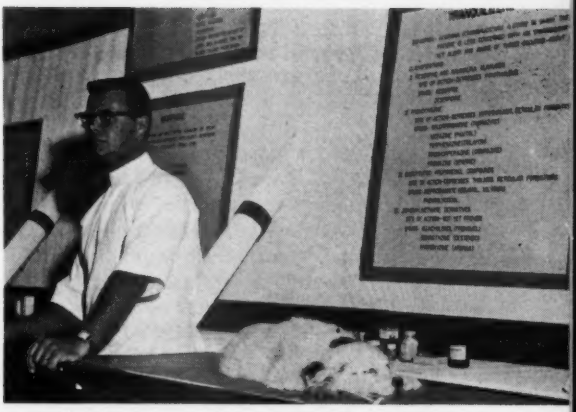


Fig. 9. Tranquilizers explained in terms the visiting layman can understand. Student on hand answered questions throughout the day-long program.

at KSC School of Veterinary Medicine

Fig. 8. Display illustrating and explaining ramifications that attend the use of anesthesia.

Fig. 10. Examples of good clinical photography attract the attention of visitors. Not shown here are x-ray photographs used in diagnostic procedure.

Treatment for Bovine Mastitis

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THIOSTREPTON AND NEOMYCIN (Neothion — Squibb) are a combination, the former a new antibiotic and the latter an established antibacterial agent formulated for intramammary infusion in the treatment of bacterial mastitis. Thiostrepton, produced by a species of Streptomyces originally isolated from a New Mexico desert soil sample, is highly active *in vitro* against a variety of Gram-positive cocci.[1] In laboratory animals, thiostrepton has exhibited considerable activity against *Streptococcus pyogenes* as well as against *Micrococcus pyogenes* var. *aureus*, including penicillin-resistant strains.[2] Neomycin alone, in low concentrations, is effective by intramammary infusion against many Gram-positive and Gram-negative bacteria associated with bovine mastitis, with a minimum of udder irritation.[3-5] Therapeutic results obtained in the initial clinical studies with this new combination of antibiotics are described for a series of cases encountered in the author's practice.

Materials and Methods

Neothion was supplied in single-dose tubes (7.5 cc.) containing 150 mg. of neomycin base (as sulfate) and 25,000 or 50,000 units of thiostrepton, suspended in Plastibase, a polyethylene-mineral oil ointment base.

A total of 22 cows were treated, 16 of the animals having acute or peracute mastitis, and six animals exhibiting chronic mastitis. One tube was instilled daily in a single infusion, for a period of one to six days in both groups.

Two additional cows without active mastitis but with a history of infection and with palpable evidence of fibrosis, each received one tube daily for three days, to determine any increase in the degree of fibrosis.

Results

In 15 of the 16 animals with acute or peracute mastitis, Neothion provided good to excellent therapeutic effect within one to six days after treatment was started. Milk usually returned to normal appearance and flow, with elimination of "slugs," flakes or serum within this period. In one animal, peracute infection had proceeded too far to permit ameliorative action by the drug.

Animals with chronic mastitis responded well in all instances, producing normal or near-normal milk flow after one to five days of therapy. In chronic cases exhibiting considerable granulation of udder tissue, with "pockets" of infection not readily ac-

TABLE 1. Summary of Clinical Results with Neothion in Mastitis

Number of Animals and Diagnoses	Dosage and Administration	Therapeutic Results
16 cows with acute of peracute mastitis	1 tube daily for 1 to 6 days	Good to excellent results in 15 of 16 animals; milk usually normal in appearance, with "slugs" and serum disappearing soon after therapy.
6 cows with chronic mastitis	1 tube daily for 1 to 5 days	Good results in all animals; milk returned to normal, "slugs" disappeared. Only temporary relief in cases with granulation forming inaccessible "pockets" or infection.

cessible to antibiotics, repeated attacks may be anticipated.

In the two animals receiving the drug to determine its effect upon the degree of fibrosis, no irritant action or consequent increase in fibrosis could be observed.

Table 1 summarizes data recorded during the study.

Discussion

Increased attention has been given to mammary infections caused by strains of *Micrococcus pyogenes*, particularly since penicillin-resistant strains of *Streptococcus agalactiae* have not been reported.[6,7] Infections with *Micrococcus pyogenes* have not responded readily to low concentrations of penicillin usually effective against streptococci.[8] Of some pertinence is the evidence that certain strains of *Micrococcus pyogenes* isolated from the mammary gland are capable of growth in a culture medium containing 10 units of penicillin per cc.[9-11] Massive injections of penicillin with dihydrostreptomycin have been more successful, but some *Micrococcus pyogenes*-infected glands have not been freed of the pathogen after as many as six series of treatment with this combination.[6] The fact that thiostrepton is active in laboratory animals against penicillin-resistant strains of staphylococci suggests that Neothion may be useful in the treatment of mastitis caused by such strains. However, further trials with the new preparation are necessary in order to evaluate this possibility.

Summary

1. In a preliminary clinical trial, Neothion, a new mastitis preparation for intramammary infusion, was administered to 22 cows with mastitis. In 15 of 16 cows with acute or peracute mastitis, and in all six chronic infections, good to excellent results were obtained within one to six days after therapy was instituted. No evidence of toxicity was observed in any animal.

2. Recurrences may be anticipated in certain chronic infections where granulation prevents effective access of the antibiotic to the infecting agent.

3. In two cows without active mastitis but with a history of chronic infection and with palpable fibrosis, no increase in the degree of fibrosis was observed after daily infusion of the drug for three days.

4. In the small series of cases treated, Neothion appeared to be at least as effective as penicillin-streptomycin in the majority of cases, and more specific in certain instances, possibly as a consequence of its wider spectrum.

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Reproductive Efficiency

In a research project from the USDA regarding The Comparative Reproductive Performance of Nursed Cows, and Milked Cows (*Jour. Animal Science*, p. 640, August 1958) it is in part reported that "the results indicate that the reproductive efficiency of cows milked twice daily is considerably better than that of cows nursing calves."

CASE REPORT

Repair of a Fractured Tibia in a Pony

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School of Veterinary Medicine
Columbia, Missouri

FIGURE 1.

FIGURE 2.

ON NOVEMBER 5, 1957, a Shetland pony stallion, 18 months of age, was brought to the Veterinary Clinic at the University of Missouri.

That morning the pony, which was in the pasture with other ponies, was found with the left hind limb injured and dangling. It probably or possibly had been kicked by one of the other ponies. Examination revealed definite crepitation and a fracture above the hock. Radiographs were taken. The lateral (fig. 1) and antero-posterior (fig. 2) views showed a badly communuted fracture of the tibia. The bone was so shattered that fixation by the use of pins was impractical.

Procedure

A sedative dose of chloral hydrate solution was given intravenously and the pony cast in lateral recumbency with the injured limb uppermost. Hair was clipped and the fragments of the tibia manipulated into apposition. The size of the leg made this procedure relatively easy. Cotton padding was wrapped around the leg from above the fracture down to and including the foot. Yucca board splints were placed on the inside and outside of the leg and plaster Paris bandages wrapped reasonably tightly over the splints.

A modified Thomas splint was made in sections out of one-half inch aluminum alloy rods. The upper portion in the form of a ring and the lower portion incorporated into a shoe to extend below the hoof. The two portions were fastened together with lugs so the splint could be extended and secured.

N666

FIGURE 3.

The splint was placed over the cast and the lower portion anchored with more plaster of Paris bandage. The splint was then adjusted for length and the lugs tightened. A third rod was placed on the side extending from the top of the ring to the bottom of the shoe. This made the cast more stable.

The pony needed help to get on his feet the first time but soon learned to get up and down without assistance. Light exercise was given daily. The pony used the splint over the light weight cast as a crutch, thus bearing no weight on the fractured bone.

A radiograph taken eight weeks later (fig. 3.) showed the bone healing satisfactorily. The cast was removed at the end of 12 weeks.

The bones were in good alignment and the leg was straight. The pony walked with a slight limp that was expected to disappear in a few weeks.

ANTIBODY RESPONSE OF THE BOVINE UDDER

Continued from page 4

1. Intramammary infusions of an antigen made during the dry period resulted in a higher antibody content in the colostrum than in the blood serum.

2. Intramuscular and subcutaneous injections of the antigen made during the dry period resulted in antibody appearance in both colostrum and blood serum but not as much as followed intramammary infusions made during the dry period.

3. Antibodies appeared in the milk within two hours after lactating cows were infused with the antigen.

4. No response in milk antibody levels was obtained from intramuscular booster injections of the antigen, but there was an increase within three to nine hours in the antibody content of the milk from cows after intramammary booster infusions of the antigen had been made.

5. Persistence in antibody content of the milk and blood serum remained at a high level over a period of 246-288 days following immunization during the dry period.

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Earlier studies indicated that calves vaccinated against leptospirosis at one and two months of age responded poorly. This report establishes that three to five month old calves are sufficiently mature to acquire relatively effective resistance following vaccination with L. pomona *bacterin.*

Immunization of Cattle Against Leptospirosis

III. Resistance to Leptospira pomona Infection of Cattle Vaccinated when Three to Five Months of Age

R. W. H. GILLESPIE, Ph.D. and S. G. KENZY, D.V.M., Ph.D.

Pullman, Washington

IN A RECENT REPORT[1] it was noted that cattle vaccinated at six to eight months of age with *L. pomona* bacterins usually (11/12) resisted infection when challenged seven to eight months later. On the contrary, few (4/17) calves vaccinated when one to two months of age proved immune when challenged after this same interval. For this reason, it seemed desirable to determine the immunogenic response to vaccination of cattle at an intermediate age. The opinion that very young animals are often immunologically immature is widely held, and since a minimal age often recommended for vaccination against blackleg is three months, calves of approximately this age were used.

Materials and Methods

Animals. Ten calves were vaccinated. Ages of five ranged from approximately four months (114 days) to a little over five months (156 days) at the time of vaccination. Ages of the other five were unknown but were estimated to be between three and five months when vaccinated. Males and females were equally represented and the group included several common breeds and cross-breeds. Repeated agglutination tests during a quarantine of several weeks showed these calves to be free of *L. pomona* infection. All animals appeared to be free of disease and in good condition.

Bacterins. For comparative purposes, two bacterins were employed. One was a commercial product (Leptogen — Pitman-Moore), the other was a formalinized (0.2%) whole culture bacterin produced in our laboratory from a number of recently isolated strains of *L. pomona.* Five calves were inoculated with each bacterin. Calves were selected according to known, or estimated, age and also sex, so that the two vaccine groups would be comparable. Each animal received a single 5 ml. dose of bacterin administered subcutaneously in the shoulder area. They were bled before and at regular intervals after vaccination in order to follow serological developments.

From the Washington Agricultural Experiment Stations, Department of Veterinary Science and Department of Veterinary Microbiology, College of Veterinary Medicine, State College of Washington, Pullman. Scientific paper no. 1730; projects 1176 and 144.

Challenge. Nine of these calves (one died before challenge) were exposed 13 months after vaccination, together with five normal cattle of about the same age.

Method of evaluation. Evaluation of the bacterins is based primarily on two criteria: (1) results of challenge and (2) demonstration of protective antibody in postvaccinal sera. The method of challenge, and a description of the virulent strain used for this purpose, are given in earlier reports.[1,2,3] Nine vaccinees and five controls were challenged by repeated exposure (twice daily for four days) with urine from an infected calf that was "shedding" large numbers of leptospires. Urine was diluted about 1:5 with water immediately after collection in order to reduce any anti-leptospiral action. It was then administered to the cattle (through eyes and nostrils) as rapidly as possible since progressive reduction of infectivity of such material is known to occur.[3] As usual, the order of exposure of individual animals was deliberately "randomized" in an attempt to insure a more nearly equal distribution of the infectious material. Exposure by these routes was usually completed in 30 to 45 minutes.

Since we have demonstrated that infection can be transmitted through contaminated drinking water,[4,5] infectious urine was added to the water provided for these animals during the four days of exposure. The procedure has been described elsewhere.[1,2,3] The volume of urine added sometimes totaled as much as three or four liters a day. The quantity of water supplied was adjusted as closely as possible to the rate of consumption by the animals. This was necessary to reduce the interval between contamination and consumption and to keep the concentration of urine as high as possible. As a control measure, contaminated water was tested for infectivity at intervals after the addition of urine.

Criteria of Infection. A number of criteria were used to determine whether infection occurred as the result of challenge: (1) rectal temperatures were taken twice daily for two weeks after exposure; (2) animals were observed for other clinical signs of infection; (3) blood samples were taken to determine serological response; and (4) individuals which revealed serological evidence of infection were examined by darkfield for leptospiruria and also by intraperitoneal inoculation of urine into weanling hamsters.

TABLE 1. Challenge Results with Three to Five-month-old Calf Vaccinees (Group VI) 13 Months after Vaccination

Animals		Serological titers (A-L* Test)			Clinical Data		
No.	Status	Post-vac. (6 wk.)	Pre-chall.	Post-chall. (6 wk.)	Fever (max.)	Leptospiruria (number "shed")**	Resisted Infection†
110	No. 1 vac.	10^{-1}	10^{-1}	10^{-1}	.....	.....	
111	No. 1 vac.	10^{-1}	10^{-1}	10^{-1}	.....	.....	
114	No. 1 vac.	10^{-1}	10^{-1}	10^{-1}	.....	.....	5/5
126	No. 1 vac.	10^{-1}	10^{-1}	10^{-1}	.....	.....	
130	No. 1 vac.	10^{-1}	10^{-1}	10^{-1}	.....	.....	
112	WSC vac.	10^{-1}	±	±	.....	.....	
113	WSC vac.	—	—	10^{-3}	103.6	None detected	
127	WSC vac.	10^{-1}	10^{-1}	10^{-1}	.....	.....	3/4
128	WSC vac.	10^{-1}	10^{-1}	10^{-1}	.....	.....	
131††	WSC vac.	—	.....	.....	.....	.....	
129	Control	.....	—	10^{-4}	106.0	Few	
156	Control	.....	—	10^{-4}	106.4	Many	
157	Control	.....	—	10^{-4}	105.4	Few	0/5
159	Control	.....	—	10^{-3}	103.2	Few	
165	Control	.....	—	10^{-4}	105.0	Few	

*Agglutination-lysis test; ± = weak reaction.
**None detected = either by darkfield examination or hamster inoculation.
Few = small numbers observed by darkfield examination.
Many = many thousands to several millions of leptospires per ml.
†Ratio of number resisting infection to number exposed.
††Died before challenge.

Demonstration of Protective Antibody. Bovine serum samples collected during these investigations were stored at -20 C. After the results of challenge became available, selected sera were titrated for protective antibody, using a procedure originating in our laboratory.[9] Baby chicks were inoculated, first with dilutions of the sera to be tested and then with the standard infectious dose (approximately 100 m.i.d.'s) of *L. pomona* culture. Some weeks later the chicks were bled and sera tested for agglutinins to determine which dilutions of bovine sera had conferred protection.

Results

The results of challenge of this group of vaccinees, along with 5 normal controls, are presented in tables 1-3. Table 1 gives the data for the individual animals, including the agglutinin titers that appeared following vaccination. Table 2 illustrates the correlation between the appearance of protective antibody following vaccination and resistance to infection on challenge. Table 3 gives the results of challenge in summarized form.

One of the vaccinees (no. 113) and all of the controls became seropositive (table 1). Number 113 was never observed to "shed" leptospires, whereas all five controls did. Four of the five control animals had high fevers of several days duration in contrast to no. 113, which had a low temperature (103.6 F.) on one day only. Only two vaccinees, no. 113 and no. 131, failed to produce vaccination titers of 1:10 or higher. No. 131 died before challenge; the other (no. 113) was the only one of the nine vaccinees that became infected on challenge. This animal was also one of the youngest of the group (125 days of age) at time of vaccination.

Protective antibody tests with sera from this group of animals gave results that agree completely with challenge findings. (See table 2.) Protective antibody was not detected in the initial blood samples from any of the animals. Six weeks after vaccination, either individual or pooled sera from all the vaccinees, except no. 113, revealed protective antibody titers. This one animal, no. 113, was the only vaccinee that became infected on challenge.

Discussion

It appears that calves three to five months old are sufficiently mature to develop good immunity when inoculated with *L. pomona* bacterins. This is in sharp contrast to evidence presented in an earlier report[3] for calves vaccinated at one to two months of age.

We feel that the exposure that these

TABLE 2. Correlation between Protective Antibody Titers and Results of Challenge

Serum or pooled sera tested	Vaccinated with bacterin	Protective antibody titers* Before vaccination	6 wk. after vaccination	Before challenge	Response to challenge
Pooled sera, 5 calves	No. 1	Neg.**	1:10†	Neg.	immune
Pool: 112, 127 128 & 131	WSC	Neg.	.....	.....	immune
112	WSC	.....	1:2.5††	Pooled	immune
127	WSC	.....	1:2.5††	sera:	immune
128	WSC	.....	1:2.5††	1:2.5††	immune
131‡	WSC	.....	1:2.5††	.....	.....
113‡‡	WSC	Neg.	Neg.	Neg.	infected
Pooled sera, 5 control calves	controls	.....	.....	Neg.	all 5 infected

*Titration in chicks two days old, using two chicks per serum dilution and an infectious dose of 1000 leptospires.
**Neg. = no protection with 1:2.5 dilution of serum, lowest dilution tested.
†Highest dilutions tested.
††Only one of the two chicks was protected.
‡Died before challenge.
‡‡No. 113 was the only one of the nine vacinees that infected as the result of challenge.

cattle were given probably exceeds what the average animal is likely to receive under natural conditions. (This comment may apply particularly to exposure through the eyes and nostrils, but perhaps also to the degree of contamination of the drinking water.) Regularity of infection of controls seems to support this concept.

Virulence

Furthermore, the following evidence indicates that the strain of *L. pomona* used for challenge possessed relatively high virulence for the bovine. It has caused fatal infection in three calves. Two of 11 heifers infected in late pregnancy have aborted. Relatively severe infection was frequently observed, not only in younger animals but also in cows two or three years old. (Severity was judged by the development of a high fever of several days duration, and the excretion of large number of leptospires, often numbered in millions, and sometimes 50 million or more per ml. Additional criteria were sometimes available such as hemolytic anemia, hemoglobinuria and the development of unusually high protective antibody titers.) Cross infection of pen-mates occurred on two occasions when presumably susceptible animals were intentionally exposed in environments known to be contaminated. In these two instances the mode of transmission is unknown but could have been through ingestion of drinking water contaminated with "shedder" urine.

Appearance of agglutinins at high titer, or a clearly defined increase (100-fold or more) over the vaccination titer, must be considered to be the most reliable single criterion of *L. pomona* infection. (Some animals may exhibit a clear-cut rise, 100-fold or more, in the agglutinin titer following challenge, but never show leptospiruria, even though the urine is thoroughly and repeatedly examined.) Reactions of this magnitude cannot be attributed to anamnestic response. Although vaccination titers may sometimes be enhanced by heavy and repeated exposure through natural routes of entry, the effect is often imperceptible and has never been observed to exceed a ten fold increase. (See data on Groups I and IV.)[1,3] Furthermore, other evidence of infection was almost invariably obtained, such as a record of low-grade fever or demonstration of the appearance of protective antibody in relatively high concentration.

Protective Antibody

The appearance of protective antibody following vaccination and resistance to infection on challenge seem to be correlated. The only vaccinated animal of the nine challenged that became infected (no. 113) was similarly the only one that had produced no protective antibody as the result of vaccination. The low protective titers that result from vaccination with types of immunizing agents currently available ordinarily disappear within a few months. Nevertheless, animals that have responded to the bacterin with the production of protective antibody may be expected to resist infection for some time after the antibody is no longer

TABLE 3. Summarized Challenge Results with Calf Vaccinees[a] 13 Months after Vaccination (Group VI)

Animals Status	No.	Showed post-vac. PA[b]	Infected on challenge	Evidence of infection: pos. A-L test*	Fever	Lepto-spiruria**	Resisted infection
No. 1 vac.	5	5/5	0/5	0/5	0/5	.....	5/5
WSC vac.	5	4/5	1/4†	1/4	1/4	0/1††	3/4
Total vaccinees	10	8/10	1/9	1/9	1/9	.....	8/9
Controls	5	(0/5)‡	5/5	5/5	5/5	5/5	0/5

[a]These cattle were vaccinated at 3 to 5 months of age with a single dose of bacterin.
[b]Protective antibody.
*Agglutination-lysis test.
**Leptospiruria was determined by darkfield examination and by weanling hamster inoculation.
†One of the five calves vaccinated with this product (# 131) died before challenge.
††No leptospires were detected in the urine samples from the one vaccinee that became seropositive (# 113) either by darkfield or by animal inoculation.
‡*Pre-exposure* sera from the control heifers.

detectable. In contrast to the low levels of protective antibody resulting from artificial immunization, high titers (up to 1:3000) may appear following infection.

Summary

1. Calves that received *L. pomona* bacterins when three to five months of age acquired relatively effective resistance. Only one of nine animals challenged 13 months after vaccination became infected. By contrast, as reported earlier, calves vaccinated at one to two months of age seemed to respond poorly, 13/17 infecting on challenge six to eight months later.

2. Vaccination may result in the appearance of protective antibody. A correlation exists between the appearance of demonstrable concentration of this antibody and resistance to infection.

Acknowledgement

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This investigation was supported in part by (1) funds provided for biological and medical research by the state of Washington, Initiative Measure no. 171, (2) research grant E707-C3 from the National Institute of Allergy and Infectious Diseases of the National Institutes of Health, Public Health Service, and by grants from (3) Pitman-Moore Company, Indianapolis, Ind., and (4) the Veterinary Clinical Research Division, American Cyanimid Company, Pearl River, N. Y.

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Poison Gas in Corn Silage

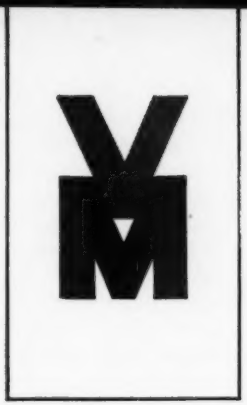
Poison gas generated by corn silage is a special problem on Wisconsin farms this fall, according to the College of Agriculture, University of Wisconsin. This problem is well known to other states where drought conditions have prevailed in the past.

Five cases in which Wisconsin farmers were affected by silo gas have been reported. Cases of farm animals being killed by silo gas come from several areas of the state.

Corn that has suffered from dry weather may contain a high content of nitrates. These nitrates can form poisonous gas in the silo after it has been filled.

In heavy concentrations, nitrogen dioxide gas may have a brownish-yellow color. It has a sharp, irritating smell, much like laundry bleach. A few whiffs can permanently damage human lungs. A few more breaths can kill outright. If ill effects from silo gasses are suspected, victim must get into fresh air immediately. A physician should be summoned at once. There is also danger of carbon dioxide poisoning which may cause suffocation. It is oderless and colorless.

Silage high in nitrates, when fed to dairy cattle, may cause poisoning evidenced clinically by reduced milk flow, abortion, or death of the cow. Other signs are cyanotic mucous membranes, dyspnea and listlessness. Dyspnea may take the form of labored breathing or shallow fast breathing.



Special Report

UNITED STATES LIVESTOCK SANITARY ASSOCIATION

Sixty-Second Annual Meeting

Miami Beach, Florida

A SEARCHING AND STIMULATING ANALYSIS of the appropriate role of the veterinarian in America's dynamic consumer economy — and the livestock industry that is now being geared to serving it — was the thread running through all sessions of the 62nd annual meeting of the United States Livestock Sanitary Association meeting, November 4-7, 1958, at Miami Beach, Florida. Every aim of the group was to make the tempo of the meeting faster than in past years. Federal, state and territory livestock disease control officials, who make up the official family of the U.S.L.S.A., indicated at the meeting that changing problems confronting livestock growers must be met with attention not only toward the industry's economic welfare, but the public health as well.

New Officers

Officers elected to serve the Association for the coming year included the following: Mr. F. G. Buzzell, Augusta, Maine, president; Dr. J. R. Hay, Columbus, Ohio, Dr. A. P. Schneider, Boise, Idaho, and Dr. W. L. Bendix, Richmond, Virginia, first, second and third vice president respectively. Dr. Ralph A. Hendershott, Trenton, New Jersey was reemployed by the Executive Board as executive secretary.

Proceedings Book

As in past years, a Proceedings Book will be made available to all interested parties. The book itself will contain in detail all reports presented before the Association together with group action taken. The book will be distributed only to members. Interested veterinarians who wish to become members can do so by contacting Dr. Ralph A. Hendershott, 33 Oak Lane, Trenton 8, New Jersey. Membership fee is $5.

Highlights of the Meeting

Presented on the pages that follow are some of the highlights that attended the four-day meeting. The technical excellence of papers presented offers mute testimony to the strength of the association which has been attained through cooperative efforts. Deliberations at all meetings were serious, which makes repetition of the statement applied to previous meetings as meaningful an appraisal as ever before: at no other meeting is so much offered of such value in so short a time.

OVINE VIRUS ABORTION

Notes from a report by E. A. Tunnicliff, D.V.M., M.S., *Bozeman, Montana*

Ovine virus abortion (enzootic abortion of ewes) is caused by a virus of the psittacosis-lymphogranuloma group. The disease was recognized abroad in 1950. The virus was identified from aborted ewes in Montana and an adjacent state in the spring of 1958. There is evidence that this is not a newly introduced disease, but one that had not been identified previously and is probably rather widespread.

Clinically, virus abortion and vibriosis can not be differentiated. Serological tests, animal and chick embryo inoculations, bacteriological procedures and microscopic demonstration of elementary bodies are necessary for the diagnosis for virus abortion.

ANAPLASMOSIS CONTROL

Notes from a report by W. E. Brock, D.V.M., Ph.D., C. C. Pearson, D.V.M., *and* I. O. Kliewer, M.S., *College of Veterinary Medicine, Oklahoma State University and Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma.*

The complement-fixation test, an accurate method of diagnosing anaplasmosis carrier cattle, has provided a tool for the control of this disease. Concurrent with the development of the complement-fixation test, treatments using the tetracycline antibiotics have been devised to eliminate the carrier infection. A combination of these two recent developments offers a method for the control of anaplasmosis which can be used when it is desirable to retain valuable blood lines in a herd.

Anaplasmosis carrier infections have been eliminated by oral administration of 1.5 mg., 2.5 mg., or 5.0 mg. of chlortetracycline per pound of body weight daily for 60 days under controlled dry lot conditions. When this method of treatment (5.0 mg. dosage) was applied to cattle under field conditions, including lay supervision of the treatment, 3 out of 18 cattle or almost 17% of the animals apparently remained anaplasmosis carriers.

In spite of the difference in results between the two parts of this experiment identification of carrier animals combined with this method of herd treatment appears to be a satisfactory means of control to save breeding and show stock.

The cost of the treatment described is estimated to be $60. per animal when the 5.0 mg. dosage is used. Although its use seems limited to valuable cattle, treated either individually or on a herd basis, this procedure should receive consideration in any anaplasmosis control program. Under a voluntary testing plan the opportunity to save certain infected cattle could mean the difference between acceptance and rejection of the program.

LEPTOSPIROSIS DIAGNOSTIC PROBLEMS

Notes from a report by Erskine V. Morse, D.V.M., *The Veterinary Medical Research Institute, Division of Veterinary Medicine, Iowa State College, Ames, Iowa.*

The diagnosis of leptospirosis presents a major problem to the laboratory worker and the veterinary practitioner. *Leptospira pomona* is the etiological agent in approximately 98% of the outbreaks in swine and cattle in the United States. However, as in the case of salmonella, many species or serotypes of leptospira are known and some have cellular antigens in common. Serological cross reactions may present a frustrating and complex situation to those engaged in routine laboratory diagnosis.

The *L. pomona* serum titer is an indication of the past or present infection with *L. pomona* or past or present infection with an antigenically related Leptospira causing the so called serological cross reactions. In this respect *L. icterohemorrhagiae* and *L. canicola* appear to present a diagnostic problem in *L. pomona* infections. In the vast majority of instances the homologous titer is in a significant range and exceeds that of the heterologous titers.

It would appear that passive antibody transfer is not confusing the issue in the overall serodiagnosis of leptospirosis.

What serological titer indicates active infection?

This is not known. A 1:10,000 titer, using a modified agglutination-lysis test, has been

suggested to indicate active infection in swine. Experience indicates the same condition may exist for cattle. By Stoenner's method, the 1:160 titer is considered to have significance since it indicates probable past or present infection with a specific serotype. This interpretation is applicable for both swine and cattle. Obviously, more concrete information is needed in order for diagnostic facilities to provide the most helpful service.

The terms "reactor" and "suspect" or "positive" and "negative" are confusing to all concerned. They do not have the same connotation in any two laboratories. The veterinary practitioner and livestock producer consider these terms in the same light as the bovine brucellosis "reactor," *e.g.*, positive at 1:100 or 1:200. Obviously, the situation is not comparable and is leading to consternation and some animosity. This is most unfortunate and only complicates matters. It is suggested that the term "positive" be applied to a specified titer and test, such as "positive at 1:160 (Stoenner's method)" or "positive at 1:100 (agglutination-lysis)." Perhaps "negative" should be used only for sera which do not react at any dilution. An explanatory note should accompany the report and delineate what various titers mean in the light of our present knowledge as applied to the test employed.

Leptospirosis is a herd problem. The diagnosis of active infection can best be made on a herd basis. It is an all or none principle, for if one actively infected animal is present, the entire herd is potentially infected. In Wisconsin during 1952-55, it was suggested that serum samples from large herds along with a complete clinical history be submitted somewhat as follows: a few sera from cattle which aborted, some from those currently sick, and a few sera from the recovered cases. Titers of 1:10,000 or higher, using the modified agglutination-lysis test, were indicative of active leptospirosis if substantiated by clinical history typical of leptospirosis. The results of most testing procedures can be put into more concrete and meaningful terms if the clinical status of a herd is known.

SWINE BRUCELLOSIS

Notes from a report by S. H. McNutt, D.V.M., *Madison, Wisconsin.*

Knowledge of swine brucellosis is extensive. The proposals for swine brucellosis control and eradication presented at previous meetings of the United States Livestock Sanitary Association have been adequate and excellent. This is a happy situation.

Nevertheless, there is urgent need to consider the disease. This need arises from misunderstandings and misinterpretations relative to the facts on swine brucellosis which in turn have resulted in widely divergent state brucelosis regulations. Widely divergent regulations in the face of well established facts make for confusion among producers who cannot be expected to know the background or basis for such regulations. Just as serious is the fact that such divergency is impossible to explain on the basis of sound disease control. For example, there is a great difference of opinion on what constitutes a brucellosis free swine herd or, indeed, how to define a brucellosis free hog in law or regulation. On these points, as well as on others, there is complete agreement in only one way — everyone agrees to disagree with the other fellow. This cannot be said to be sound disease control nor can it be expected to win the confidence of producers.

Actually the situation is not nearly as complicated or so serious as many believe. If the various states would each provide for certification of individual herds, as brucellosis free, and the producers, or at least a part of the producers, would apply for certification through their local people, everyone would be amazed to find how many herds are already entirely free of brucellosis — how many could be certified brucellosis free on the initial tests. Many states provide for certification and machinery for blood testing but expect the producers to supply the blood samples. This procedure is most simple and direct, and with understanding by all would be the most effective. Presently, it is believed that swine brucellosis will not greatly influence bovine brucellosis eradication; but, if it does, swine producers can expect drastic rules and regulations, which we all hate, directed toward eradication of swine brucellosis. Janney

(Master's thesis, University of Wisconsin, 1958), while investigating reasons for infections in certified counties (and also better means of eradication) encountered a cattle herd that was infected with *Br. suis*. On continued investigation of conditions on the farm involved, it was found that hogs had been kept on the farm but they had just been sold for slaughter and could not be examined. It is likely that the hogs were responsible for the outbreak of brucellosis in this herd that had been clean.

If this sort of thing is recognized often, pressure will be brought on the swine producers and in this case demands will be arbitrary. Swine producers themselves can do the best job on control and eradication without outside pressures. In addition, the whole process of better swine brucellosis control and eradication appears to be simple as compared to bovine brucellosis. Three main factors make for simplification in swine brucellosis. They are:

1. There is less herd infection in swine.

2. The disease is self-limiting especially in herds of reasonable or small size — much more so than in the case of cattle herds.

3. Infected boars are a most significant source of spread.

The first of these factors has already been mentioned. Surveys show no increase in infection and there is reason to believe producers generally are more careful of their breeding stock so there has been a decrease in swine brucellosis. The incidence of the disease has never been estimated at more than 2%.

Most infected hogs recover if given time. It follows that infected herds become brucellosis free — there are not enough susceptible hogs in herds, especially small herds, to keep the infection going; and it must be admitted that following recovery, most swine have a degree of resistance regardless of age.

In regard to the spread of swine brucellosis, the infected boar has long been recognized as a main factor. Producers generally are putting forth increased effort to select brucellosis free herd sires. Many investigators are of the opinion that if infected boars were controlled, swine brucellosis would be greatly reduced — almost to the vanishing point. At the same time, all are aware that the infected hog, either male or female, can spread the disease either directly or indirectly. In Iowa, *Br. melitensis* was shown to spread from cattle to swine thence to man, and it has been demonstrated that swine pick up *Br. abortus* infection.

The following is proposed on swine brucellosis control:

1. That the recommendations of the U.S.L.S. Association for control and eradication of swine brucellosis be followed.

2. That the term "agglutination test" be defined by each state that has strict regulations and laws on swine brucellosis.

3. That each state arrange for certification of brucellosis free swine herds — and that the term "brucellosis free" be as defined already by the U.S.L.S.A. It is suggested that producers arrange for meeting the requirements of a "brucellosis free herd" without expense to the state except for conducting tests and bookkeeping.

4. That each state consider prohibiting the movement of breeding stock unless such stock comes from brucellosis free herds as defined by the U.S.L.S.A.

VETERINARY MEDICINE IN THE USSR

Notes from a report by C. D. Van Houweling, D.V.M., *Agricultural Research Service, United States Department of Agriculture, Washington, D. C.*

Russia has a military veterinary corps. Since 1954, the work of the corps apparently has been changed, following the demobilization after World War II and the shift from animal to mechanical transportation. The emphasis has changed to deal more with the sanitary control of meat for the armed forces and less with the handling of horses and other livestock. They point to the threat of atomic weapons and of bacterial agents which might be used by their enemies as presenting new problems for them.

Civilian veterinary medical activities in the Soviet Union are guided and controlled by the central government in Moscow through the Veterinary Collegium of the Ministry of Agriculture. It might be called the policy making body. Each republic

also has its Veterinary Collegium and Ministry of Agriculture, responsible to Moscow.

The Collegium

Second in power to the Collegium is the Academy of Agricultural Sciences. It has six departments. One of these, Animal Husbandry and Veterinary Science, has supervisory jurisdiction over three of the largest veterinary research institutes in the Soviet Union. They are the All-Union Institute of Experimental Veterinary Medicine (known as VIEV), the All-Union Research Institute of Veterinary Sanitation and Ectoparasitology, and the All-Union Institute of Helminthology. We visited these in Moscow. Each of the 15 republics has one or more republic research institutes, the number determined by the size of the republic and the livestock population.

Generally, the activities of these institutes are confined to research, although a few make a limited number of biological preparations. Some also give refresher courses of six weeks' or three months' duration to veterinarians. There are 158 agricultural scientific institutions, and 650 experiment stations and field laboratories.

Artificial insemination is being used widely, not only in cattle but also in sheep, horses, and to some extent, experimentally in swine. It is required in herds where trichomoniasis and brucellosis exist.

Research in animal diseases is conducted in veterinary schools and research institutes. There are also major research institutions in the Ukraine, Byelorussia, Kazakhstan, Uzbek, Turkmen, Georgia, and Azerbaijan.

Many diseases which we know and deal with are reported to occur in Russia, such as tuberculosis, brucellosis, anthrax, hog cholera, fowl pox, and anaplasmosis. Foot-and-mouth disease is one of their most serious problems. Other diseases which exist there and not here include sheep pox, *Brucella melitensis* in sheep, contagious agalactia in sheep and goats, glanders, and some parasitic diseases.

Most of the schools and laboratories have little more than a minimum of equipment. Improvement is being made as modern equipment becomes available. Some laboratories are equipped with electron microscopes and some are experimenting with isotopes. Some are also beginning to work with tissue culture.

A major deficiency in animal disease research is the apparent lack of facilities for experimental animals, at least near the research centers. Experimental studies involving livestock and poultry were not observed at any of the institutions visited.

This suggests that many biological investigations chemotherapeutic trials, and other experimental control measures are probably pursued largely on the collective and state farms when specific problems arise.

Veterinary parasitology in the U.S.S.R. semed to compare more favorably with work in the United States than was evident with any of the other veterinary sciences we observed.

Educational Program

The U.S.S.R. depends on its strong educational program for an adequate supply of veterinarians for employment at state and collective farms, diagnostic laboratories, food inspection stations, and research and teaching institutions. The Government operates 99 agricultural high schools and 34 veterinary schools, widely distributed geographically. Some schools of veterinary medicine are combined with zootechnical institutes for the training of veterinarians and animal husbandmen.

A total of 30,000 teachers instruct in veterinary and animal husbandry schools, some 14,000 in veterinary medicine. Their primary purpose is the teaching of students, although research projects are conducted, especially during summers.

The ratio of teachers to pupils is highly favorable . . . ranging from one to ten at the Moscow Veterinary Academy to the highly individualized teaching of the Leningrad Veterinary Institute, where the ratio is one to four.

The schools are graduating about 3,500 veterinarians a year . Today some 42,000 graduate veterinarians are working in Russia. There are also about 48,000 veterinary assistants or technicians.

The curriculum of the veterinary medical

schools is uniform throughout the USSR, with 5 years in professional education. Students of high scholastic ability may go directly to the professional schools on completion of high school. Students of average ability are expected to spend three years in practical training on a farm before admission to a school of veterinary medicine. Increasing emphasis is being given to this practical experience — presumbly to discourage development of a bourgeois class.

The schools are highly selective, with admission based on previous scholarship and examinations. At the Alma Ata Zoo-veterinary Institute, for instance, a class of 225 new students is selected from approximately 1,300 applicants. No desirable student is excluded because of personal inability to finance his education. Instruction and lodging are provided without cost and needy students receive a stipend sufficient for food and clothing needs. Students whose parents are financially able to pay their way do not receive government help.

Two graduate degrees are offered. The Candidate of Science requires approximately three years of study and the Doctor of Science from five to ten years of study. In graduate study emphasis is on research. The Doctor of Science conveys honor and usually qualifies the recipient to full professorship on a teaching or research faculty.

XVI International Congress

The United States Committee for the XVI International Veterinary Congress to be held in Madrid, Spain, May 21-27, 1959, has received a limited supply of the Preliminary Program of the Congress as well as forms for applying for membership or for subscribing to the two-volume Proceedings of the Congress.

Veterinarians from all countries may register as members and should send their applications through their respective national committees. Veterinarians in the United States who are interested in joining as regular members, whether or not they plan to attend, will receive the Congress Proceedings as part of their membership; those who only want to receive the publications may subscribe for them.

The fees are as follows:

Ordinary (regular member
600 pesetas—$15.00
Subscriber for publications only
400 pesetas— 10.00

Interested veterinarians may obtain applications by writing to: U. S. Committee, XVIth I.V.C., % A.V.M.A. 600 S. Michigan Ave., Chicago 5, Illinois.

The opening session of the Madrid Congress will take place on Thursday, May 21, and the final session on Wednesday, May 27. The headquarters of the Organizing Committee will be in the Faculty of Medicine (School of Dentistry) at University City. The sessions will be held in various locations. During the Congress, various excursions will be made to nearby points of interest, and there will also be special activities for ladies.

On Sunday, May 24, a special trip for all Congress members will be made to the Escorial and to the "Valle los Caidos," with a bullfight in the country.

The United States Committee has arranged with Travel Service Bureau, Needham, Massachusetts, to handle group travel to Madrid for American participants; already, a large number have indicated their intention to take one of the four tours offered in the leaflet mailed early in September. Anyone interested and who failed to receive the tour leaflet may obtain complete information by writing to Mr. Nelson M. Jost, Travel Service Bureau, Inc., 32 Dedham St., Needham 92, Mass., or to the U. S. Committee.

Practitioner's Laboratory

W. L. SIPPEL, V.M.D., Ph.D.

Florida Livestock Board
Kissimmee, Florida

Examination for Skin Fungi

THE DIAGNOSIS OF TYPICAL RINGWORM infections can usually be made on a clinical basis. However, it is occasionally desirable to confirm this diagnosis. In addition, other more obscure cases are seen in which the symptoms are not typical and a laboratory confirmation is very helpful. Rarely, cases of otitis media are caused by fungi. Since several ringworm fungi are transmissible from animals to man, it is often desirable to have the diagnosis on a firm foundation.

Technic

Deep skin scrapings are made from the active or peripheral part of the lesion. These scrapings should include hairs as well as the superficial layers of the skin. They can be readily made by the use of a No. 22 Bard-Parker blade. Another technic is to observe the edge of the lesion carefully and select hairs that are located in the active area. Broken or off-color hairs are most likely to be affected. These are extracted with a pair of tweezers and used for examination. Moss[1] indicates that chloroform can be applied to the lesion to show up the infected hairs which will become a frosty white. He indicates that the procedure is an aid for detecting infected hairs but is not reliable for diagnosis. Skin scrapings usually contain much debris that can be dissolved by warming (not boiling) the scrapings in 20% potassium hydroxide for a few minutes.

The hairs are placed under a coverslip in order to bring them more or less into the same plane and examined for rows of spores along the base of the hair. The low power objective is used for scanning and the high dry lens for detailed examination. Reduced light, obtained by racking down the condenser or diminishing the light source, will make the spores more easily visible. Pigment granules in hairs may be confusing to the beginner and can be eliminated by placing the hairs in 3% hydrogen peroxide solution to bleach them. The use of Amann's medium (lactophenol cotton blue) may assist in the examination. This solution serves as a combined fixing agent, stain

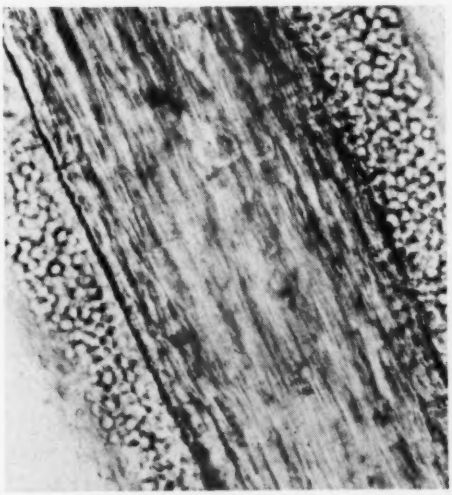


Fig. 1. Ringworm infected guinea pig hair showing ectothrix spores 475X.

Fig. 2. Spontaneous ringworm in a guinea pig due to *Trichophyton mentagrophytes*.

Photo courtesy of the Department of Health, Education and Welfare, Communicable Disease Center, Mycology Unit, Chamblee, Georgia.

*Available from National Aniline Division, Allied Chemical & Dye Corp., 40 Rector St., N. Y. 4, N. Y. as Methyl Blue, color index #706.

and mounting fluid. It is composed of the following:

Phenol crystals	20 gm.
Lactic acid syrup	20 gm.
Glycerol	40 gm.
Water	20 ml.

Dissolve the above together with gentle warming in a hot water bath and add cotton blue 0.05 grams.* The mycelia and spores stain blue with this reagent.

According to Coffin,[2] the fungal diseases of animals are aspergillosis; favus caused by Achorion spp.; ringworm, Trichophyton spp., Microsporum spp.; and thrush, caused by *Monilia albicans.*

The pathogenic dermatophytes of animals are usually of the ectothrix type (fig. 1) in which the spores are arranged along the shaft of the hair. Mycelia often are seen within the hair. Endothrix types (spores within the hair shaft) are less common in the United States.

The Wood's lamp may be of assistance in recognizing microsporum spp. of dogs and cats. The common cause of ringworm in cattle, *Trichophyton verrucosum,* does not fluoresce. Care should be taken to obtain a properly filtered ultraviolet lamp that emits light near 3,660 Angstrom units, as other types will be ineffective. Nails, keratin and a number of organic and inorganic substances also fluoresce naturally. Areas previously treated may fluoresce for this reason.

Culture of fungi is readily accomplished by diagnostic laboratories offering this service. Hairs and skin scrapings should be placed in a completely sealed envelope and sent to the laboratory for examination. Sealing in rubber stoppered tubes encourages growth of bacterial contaminants and should be avoided.

The cultural identification of fungi is a practical technique for practitioners equipped for bacteriological work.[3,4,5]

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Encephalitis

The Utah Health Department reports that 120 suspected human cases of western equine encephalitis have occurred this past summer with the peak in mid-August. Eight deaths have been reported. Cases are still occurring at a slow rate. The age distribution revealed that the highest incidence was among young people, with approximately 30% of the cases in infants under one year of age. Laboratory confirmation has been made in 23 cases thus far.

Ecological data from Utah reveal that this summer was one of the driest in recent years with only eight inches of rainfall. However, there was an abundance of water for irrigation with consequent over-irrigation and creation of stagnant pools. There were between 100 and 200 horse cases in Utah. Western equine encephalitis virus has been isolated from mosquito pool collected in chicken coops.

Animal-Man Relationships

The important roles played by animals in certain primitive societies today suggest the direct and vital part they must have had in ancient civilizations. The Tibetan without his yak, the Peruvian without his llama, the Esquimaux without his seal, caribou, or Polar bear, probably could not exist. Their whole social and economic pattern is directly keyed to these animals.

Certain modern societies depend heavily on the family cow, donkey, mule, hen, water-buffalo, or pig, while urbanized civilizations, such as our own, depend on animals less directly and obviously. Meat, dairy products, and eggs still constitute our better class proteins; wool, hides, and fur still clothe our bodies; many endocrine products and biologics have not been duplicated by synthesis.—*Kenneth B. Haas, D.V.M.*

SMALL ANIMAL PRACTICE

How would YOU diagnose this?

CASE NO. 6 Radiograph shown above: German Shepherd, 2½ years old, female. When brought to the clinic, owner's statement to practitioner was this: "She has difficulty getting up in the hind parts!"

Radiographic examination of this case indicated the cause of the patient's difficulty. How would *you* diagnose and treat this? For diagnosis and treatment, please turn to the page indicated below.

turn to page XLVII

Resorption of embryos by bitches following administration of a partially purified yeast extract is reported. Undesirable effects have not been observed following this phenomenon. The drug produces temporary prostration by lowering blood pressure, but administration of 10% of the dose at least ten minutes before treatment dramatically lessens depression. Studies are continuing.

The Effect of Malucidin on Canine Pregnancy

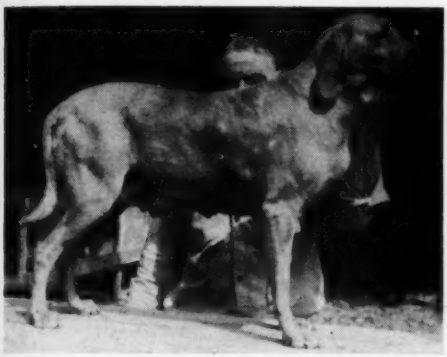

Fig. 1. Bitch A resorbed embryos three times after treatment. No apparent harm was noted.

Fig. 2. Bitch B resorbed after about 31 days of pregnancy (half term). Note distended udder, a constant feature following ovulation. This is a normal condition.

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MALUCIDIN is the name given to an extract from brewer's and baker's yeast containing an anti-infectious agent. It was discovered by Dr. Ivan A. Parfentjev when he was a member of the Yale University Department of Microbiology. Through a long study of its effects on mice and through purification, its originator succeeded in isolating the active principle. Until now research conducted with this yeast extract has been confined chiefly to its therapeutic effect on the infections of laboratory and domestic animals caused by fungi, bacteria and certain viruses. The work reported here was performed with a crude preparation containing yeast protein. The present report concerns the discovery of an unexpected property of the substance.[1-10]

History

The writer conducted certain toxicity tests for Doctor Parfentjev using rats and dogs in the standard procedure. Large overdoses produced no deaths by any routes of injection, although in dogs massive intravaneous doses (50 cc. of 2% extract to a 60 lb. dog) produced a side reaction of prostra-

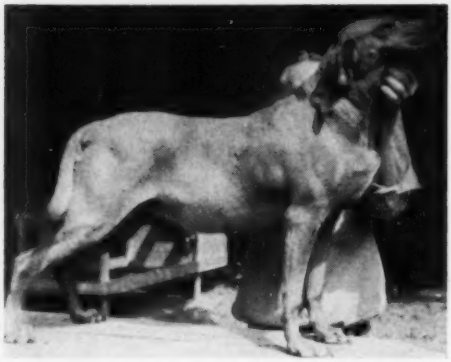

Fig. 3. Bitch C also resorbed at about 31 days of pregnancy.

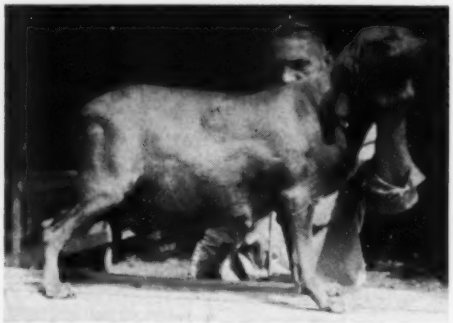

Fig. 4. Bitch D served as one of the controls. The animal is shown one week before parturition.

tion similar to "running fits" caused by agene, the bleach used in flour.

During the course of toxicity tests, 20 cc. of Malucidin was administered intravenously on May 17, 1957 to a 60 lb. bitch (bitch A) pregnant about 44 days. Two days after the injection the bitch's abdomen had shrunk in size. The pregnancy was terminated. There was no obvious discharge from the vulva. Apparently she had resorbed, not aborted, her embryos.

Previous studies had revealed that resorption of fetuses was a common occurrence in bitches infected with Carre's disease. It was therefore necessary to test the substance on other pregnant bitches.[12]

Materials and Methods

Redbone Coonhound bitches that were quite uniform and of approximately the same weight were used. Malucidin was injected intravenously. Four pregnant bitches, (B. C. D. E.) were injected when the "lumps" in their abdomens were felt to be approximately the size of hen eggs, or about half term. Lumps are composed of the fetus, fetal envelopes, placenta, uterus and the abdominal tissues and skin. In bitches with loose abdomens, such as hounds and bird dogs, it is comparatively easy to determine pregnancy in this manner (palpation).[11]

Bitch B was injected on August 11 at 11 a.m. with 20 cc. of Malucidin. She was destroyed 26 hours later. Her uterus was removed and measured by volume displacement of solution. It displaced 32 oz. There was still considerable fluid in the uterus.

Bitch C was injected August 17 intravanously with 20 cc. of Malucidin in 22 seconds. She was sacrificed 48 hours later. Practically all of the fluid was gone from the uterus which now was small and firm. It displaced 16½ oz. Shrunken placentas were still attached to the uterus. Embryos that were intact could not be found. This bitch and her sister, bitch D, when not pregnant, had each been injected with Malucidin four times previously; once intravanously, twice subcutaneously and once intramuscularly.

Bitch D was administered 20 cc. of Malucidin on September 19. First, a 5 cc. dose, and five minutes later a 15 cc. dose was administered. The bitch was sacrificed on October 3. Grossly, the uterus was almost as small as her sister's, bitch C. The shrunken placenta seemed to have persisted.

Bitch E had also been used in toxicity tests and administered the same four injections. On September 24th, she was given 20 cc. of Malucidin and was sacrificed 48 hours later. Each fetus appeared to be a lump of red jelly. There was also a tiny fetus in a sac between the cervix and the first placenta.

Bitch A at her next heat was bred and conceived. At 31 days of pregnancy she was injected again with 20 cc. and again her embryos were resorbed. A third time she was used and again resorption of embryos took place. She is now in the best of health.

During one period, March 24 to April 4, seven Redbone bitches came into heat. All were bred and all became pregnant. Three

were chosen in an attempt to determine if smaller doses would cause resorption. One of these was bitch A.

Bitch F was given 20 cc. as soon as her "lumps" reached size of hen's eggs at approximately 31 days, or half term. Bitch G was given 15 cc. Bitch A was given 10 cc. The remaining four were permitted to go full term and whelped the following number of puppies: 9, 11, 9, and 12.

All three injected bitches resorbed their embryos. There were no indicated abortions in the group; cervices appear to remain closed. All, however, exhibited typical pseudo-pregnancies always manifested by normal bitches which have ovulated.

Clinical Picture Following Injections

The value of this discovery in relieving bitches of unwanted pregnancies is at once apparent. Unfortunately, the side reaction from injections was quite severe and such treatment would be objectionable to dog owners. Clinically after intravanous injection of 20 cc. of crude preparation of Malucidin in 20 seconds, the bitch appeared weakened and dizzy and proceeded to show evidences of a severe depression. Respiration became rapid and the animal either sat or stretched out flat. Sometimes a small amount of stool was voided. Breathing became slower and deep, and the bitch would be unstable if she tried to walk. Weakness was evident. For several hours food was refused. Next day one could not tell a depression had been suffered. It seemed necessary to learn the nature of the pharmocological reaction in order to find a drug to combat the depression.

Effects on Blood Pressure

Another study was undertaken with the cooperation of Dr. Charles E. Carter of the Department of Pharmacology. A 20 lb. Beagle hound was studied for the effects of Malucidin on its blood pressure. A cannula was inserted in the carotid artery of the fully anaesthetized dog. A blood pressure tracing was begun to determine the normal heart beat. Then a 0.5 cc. dose of Malucidin was administered intravanously. Pressure dropped rapidly, breathing became somewhat rapid, but in a few minutes the blood pressure had returned to normal.

Next 4.5 cc. of the drug was injected. Although a precipitous drop was expected, nothing happened. It appeared as though the dog had been desensitized, but this could not be because it had never been sensitized in the first place. After five minutes, another 5 cc. was administered. Even with this considerable amount, only a slight drop occured, accompanied by a small change in respirations.

Dr. Margaret Day of the Department of Pharmacology tested Malucidin on the isolated guinea-pig ileum and found that it had no histamine-like activity.

Desensitizing Doses

Having learned that a small "desensitizing" dose of Malucidin would prevent depression when the full dose was administered, the next step was to determine the proper amount to give. The dog used in the blood pressure study had been anaesthetized, and now it was decided to determine the effect on animals that were wide awake.

Four Beagles weighing between 20 and 22 lb. were given doses as follows: 0.2, 0.4, 0.6, 0.8 cc. and after ten minutes (slightly longer than the time required for the anaesthetized dog to return to normal) the rest of 5 cc. was administered. Results are evident in table 1.

When Malucidin is given repeatedly at four day intervals, the "desensitizing" dose is smaller. In one Beagle only 0.2 cc. was required. Even 0.3 cc. caused a little dizziness, presumably resulting from a fall in blood pressure.

Pretreatment of the dog with a small dose of Malucidin by intravenous injection can make the animal refractive to final injection of the massive dose. By such technic the injection affects the bitch so slightly that few clients would object to this small inconvenience. One tenth of the total dose appears to be close to the proper "desensitizing dose." As the result of this research, a simple method was found to overcome the untoward reaction from injection of a crude preparation of Malucidin.

Anatomical Effects on the Uterus. The

TABLE 1

Dog	Desensitizing Dose cc.	Effect	Rest of 5 cc. after 10 minutes cc.	Effect of Main Dose
1	0.2	none	4.8	Weakness, unsteadiness, urination, defecation
2	0.4	none	4.6	No effect for 6 mins. Then vomited.
3	0.6	Panting	4.4	No observable effect
4	0.8	Panting	4.2	No observable effect

uteruses of a number of dogs were examined at 24 and 48 hours after injection of Malucidin. In all instances, the fetal portion of the placentas was completely necrotic and embryos could not be found. The cavernous layer of the decidua was grossly thickened and on microscopic examination thickening was found to be due to distension of the glands with mucoid material, together with old and fresh blood. No indication of the manner of action of the drug was apparent from this study.

Effect on Kidneys. Since there has been some question about kidney damage with continued use of certain antibiotics, it seemed well to study Malucidin in this respect. There has been no symptom of renal deficiency in any of the Redbones used repeatedly in the early toxicity tests, nor did bitch A (which has gone through four resorptions) evidence any. A male Beagle used in toxicity studies was given two 5 cc. doses at a one week interval. Eight months later he was given 5 cc. four times, at four day intervals and destroyed four days after the last dose. Pathological examination of kidneys revealed normal, healthy tubules and glomeruli. There was nothing to suggest toxic effect.

Effect of Malucidin on Other Species. Contrary to the effect of Malucidin on dogs, intravenous injections of this material into rats and rabbits, in the same amount per kilogram of body weight, did not have any influence on pregnancy. Yale strain of pregnant white rats were injected intravenously with 1 cc. of Malucidin and pregnant rabbits were similarly injected with 3 cc. of this product. In both cases it did not interfere with the normal course of pregnancy.

Dr. I. A. Parfentjev reported that he was able to produce resorption of embryos in pregnant mice by intravenous injection using large doses of Malucidin. Mice are very refractive to injection of Malucidin. Dogs are the most sensitive to injection of Malucidin of any species yet studied.

Discussion

The results of this study have failed to reveal how Malucidin produces its effect in the uterus. The writer feels that enough is known to warrant publication of this report, if for no other reason than to enlist the cooperation of those who wish to study Malucidin further.

Conclusion

Parfentjev's partially purified yeast extract was tested for its effects on resorption of embryos in bitches, mice, rabbits and female rats. At the doses given it had no effect on rabbits and rats but in the case of bitches it caused resorption of embryos when as little as 10 cc. of Malucidin was administered to a 60 lb. bitch. The drug produces prostration by lowering blood pressure, an effect lessened by administration of 10% of the necessary dose 10 minutes before the entire dose is given. No harmful effects were noted on the kidneys, nor on the reproductive tract even in the bitch treated during three consecutive pregnancies. After injection, the embryo becomes necrotic, (by 48 hours has become what grossly appears to be a lump of red jelly) and in a few days it has completely disappeared.

The effect on pregnancy discussed in this paper apparently constitutes a unique property of Malucidin. Studies with Malucidin are continuing.

Acknowledgment

The writer hereby expresses his gratitude for the invaluable help in this study given by Dr. H. S. N. Greene, chairman of the Pathology Department; Dr. Charles E. Carter and Dr. Margaret Day of the Pharmacology Department; Dr. Ivan A. Parfentjev, the discoverer of Malucidin now working independently; and to William Evers, my assistant.

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Amphibia

The amphibia, frogs, salamanders, urodeles, are used in laboratories mainly for teaching* (1) beginning biology students the main features of vertebrate anatomy; (2) to provide abundant, easily procured, embryonic material from fertilization to free-swimming larvae for purposes of demonstration and study for biology students; and (3) since the discovery by Galvani of the effect on a muscle of the application of an electric current to its nerve and Malpighi's observation of blood flowing through capillaries, frogs have been used the world around to demonstrate these phenomena.

Frog eggs are most commonly used to demonstrate living vertebrate development, but the author agrees with those who think the eggs of a Mexican salamander, the axolotl, better suited for this purpose because of their larger size.

The eggs of amphibia are easily obtained in any desired quantity in season by injecting the females with pituitrin. Unfortunately in the case of the axolotl, eggs so obtained are chiefly infertile. However, with this animal almost any abrupt change will induce spawning; changing them from warm to cold water or from cold to warm water, reducing or increasing the amount of light, even moving them from a small to a large tank will precipitate spawning. By regulating the temperature and the amount of light in the aquaria throughout the year, spawning, normally occurring only in the early spring, may be precipitated any time.

A major inconvenience in maintaining amphibia in the laboratory exists in the difficulty in obtaining feed for them. Since feed obtainable on the market is seldom suitable, particularly for the larva, in the main, it should be cultured—meal worms, fish worms, blow fly, larvae. Axolotl adults will eat bits of raw liver.

Strangely, tap water is toxic for amphibia and some fish. They should be kept in "conditioned water." Water may be conditioned by holding it in a vessel for several days exposed to the air or by mixing a small quantity of water in which amphibia have lived or finally by washing ground liver and adding the wash water to the water used to fill the aquaria.

*The Care and Breeding of Laboratory Animals, edited by Edmond J. Farris. John Wiley & Sons, Inc., New York, New York.

FIGURE 1.

Hunting and Research in Cameroons of Africa

FIGURE 2.

FIGURE 3.

AFTER SIX MONTHS in the Cameroons of Africa, Dr. Deets Pickett has returned to Kansas City in good health, but 40 pounds lighter. Active in the development and expansion of Swope Park Zoo, in Kansas City, Doctor Pickett brought with him several rare species, including Big Man (fig. 7), a baby gorilla. Doctor Pickett is currently making plans for further drug investigation and hunting.

Moniliasis and gunshot wounds of captured animals provide a major challenge to proper veterinary management. Encouraging results in treatment of systemic monilia infections with Fungazone (Amphotericin B—Squibb) administered intramuscularly at the rate of .5 to 1 mg. per pound body

Fig. 1. One of the pleasures attending a combination hunting-research trip into Africa is bagging the big one. Doctor Pickett is shown here with his native guide.

Fig. 2. Doctor and Mrs. Pickett shown here resting in a native hut. A new hut was constructed because all of those in existence were unfit to live in.

Fig. 3. Native houseboy and cook turned out delicious seven-course meals on a one-burner stove.

FIGURE 4.

FIGURE 5.

weight has encouraged Doctor Pickett to further study this major problem. Humane capture methods are to receive added study on his second.

Presented on these pages are pictures that represent the varied activities encountered on Doctor Pickett's hunting and research trip.

Fig. 4. In an improvised veterinary hospital, Doctor Pickett administered perenteral fluid therapy to debilitated young gorilla presented for treatment.

Fig. 5. Typical rhinitis associated with fatigue and shock noted in many recently captured animals. Wild animals presented frequently suffer from wounds complicated by fungus infection. Natives capture gorillas as infants by loading shotguns with nails, scrap iron, and other metal. In order to keep wounded gorillas alive after capture, they are breast fed by native "mammies," thereby subjecting gorillas to fungus infections.

Fig. 6. Young gorilla suffering from tetanus as a result of gunshot wound. Animal was treated with tetanus antitoxins and antibiotics.

Fig. 7. Big Man, Dr. Deets Pickett, and a gorilla friend. Big Man was presented to the Swope Park Zoo in Kansas City, Missouri upon return from Cameroon. The gorilla now weighs 40 pounds.

FIGURE 6.

FIGURE 7.

Gas (CO_2) operated rifle and pistol and the projectile syringe. Enlarged exploded view of projectile syringe is shown at bottom right of cut.

Courtesy The Smithsonian Institution — National Zoological Park.

Treatment of Captive Wild Animals Using an Automatic Projectile Type Syringe

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Washington 9, D. C.

THE PURPOSE OF THIS PAPER is to report further clinical applications of the automatic projectile type syringe developed by the University of Georgia and the Georgia Fish and Game Commission.[2] From early trials with drug-coated darts[1-3] to the present improved projectile type syringe, most experiments have been directed toward immobilization of animals by producing paralysis with nicotine derivatives. This report concerns the use of the automatic projectile type syringe as a method for administering routine medication.

Many captive wild animals represent delicate subjects for usual restraint procedures which are time consuming and wasteful of manpower. Administration of intramuscular antibiotics, ataraxics, vaccines, hormones, etc., without physical restraint means a considerable saving in animals and man-hours.

Equipment

The projectile syringe and the gas operated rifle which delivers the projectile have been fully described by Crockford, Hayes, Jenkins, and Feurt.[1] A gas operated hand gun which operates on the same principle and fires the same missile was used for treatments of animals in buildings or other places of close confinement.

Results and Discussion

The result of each treatment was as satisfactory as that which would have been obtained if the drug had been manually administered with a conventional syringe. An advantage existed in that the entire procedure took only seconds and required no extra help. No mechanical failures which could be attributed to the equipment were experienced. One syringe failed to completely expel its contents owing to insufficient water in the syringe gas chamber. In all cases the reaction of the animal to the impact of the syringe was less than anticipated. In no case was there any attempt by the treated individual to remove the syringe.

A forward movement of a few steps accompanied by a short grunt was the most common reaction.

An Asian elephant was treated with the flying syringe to test the penetrating effect in elephant hide. The result was entirely satisfactory, but subsequent treatments were given in the conventional manner since this individual was tractable.

Summary

Clinical data are presented on the use of an automatic projectile type syringe for the administration of intramuscular medications in captive wild animals. The equipment described provided a safe, economical method for treatment of several species.

It is hoped that further experiments will prompt the development of disposable, preloaded syringes.

Acknowledgments

The equipment described in this report is manufactured by the Palmer Chemical and Equipment Company of Atlanta, Georgia.

The experimental hand gun model was made available by Harold C. Palmer, president, Palmer Chemical and Equipment Company.

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TABLE 1. Treatments Effected with Automatic Projectile Type Syringe. (All Syringes Were Delivered Into That Heavily Muscled Region of a Hind Limb Posterior to the Femur.)

Animal	Equipment Used	No. of Treatments	Reason for Treatments	Medicament Used
Elk, male *(Cervus canadensis)*	Rifle	2	Necrotic stomatitis	Antibiotics
Grant's Zebra, female *(Equus burchelli boehmi)*	Pistol	2	Hoof injury	Ataraxic
Yak, male *(Poephagus grunniens)*	Pistol	3	Respiratory infection	Antibiotics
Tiger, male *(Felis tigris)*	Pistol	3	Fight wounds Cutaneous inf.	Antibiotics
Pigmy Hippopotamus *(Choeropsis liberiensis)*	Rifle	1	Lameness and open wound	Antibiotics and prednisone
British Park Bull *(Bos taurus)*	Rifle	1	Preshipment medication	Ataraxic
Saiga Antelope, male *(Saiga tatarica)*	Pistol	1	Superficial wounds and broken horn	Antibiotics
Bactrian Camel, female *(Camelus bactrianus)*	Pistol	2	Anestrus	Estrogenic compound
Asian elephant, female *(Elephas maximus)*	Pistol	1	Cutaneous abscess	Antibiotics
Wisent, male *(Bison bonasus)*	Rifle	1	Arthritic condition and inappetence	Antibiotics and prednisone
Spectacled Bear, male *(Tremarctos ornatus)*	Pistol	1	Dental fistula	Antibiotics
American Black Bear, male *(Euarctos americanus)*	Rifle	2	Change of quarters	Ataraxic
Nubian Giraffe *(Giraffa camelopardalis)*	Pistol	2	Pneumonia	Antibiotics and Parenteral cathartic
Great Gray Kangaroo *(Macropus giganteus)*	Pistol	2	Mandibular abscess	Antibiotics
Grizzly Bear *(Ursus horribilis)*	Pistol	1	Sinusitis	Antibiotics
Eland *(Taurotragus oryx)*	Pistol	4	Abscess	Antibiotics
Nile Hippopotamus *(Hippopotamus amphibius)*	Pistol	3	Chronic Mastitis	Antibiotics
Jaguar *(Felis onca)*	Pistol	2	Vaccination	Anti feline distemper vaccine

Research knowledge on the common respiratory condition, feline pneumonitis is condensed for the practicing clinician. Emphasis is given to diagnosis and treatment.

Feline Viral Pneumonitis

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INFLAMMATORY DISEASE of the feline respiratory system may result from any one of several infectious or non-infectious causes. The designation, feline pneumonitis, refers to the specific disease first described adequately by Baker,[1,2] and later named by Hamre and Rake.[3] The extent of the infection in nature is not known, but probably is widespread. Since mortality is low and many cases are not serious, many animals recover spontaneously without treatment, and others respond to empirical symptomatic treatment without the benefit of specific diagnosis.

The occurrence of a natural disease by the agent of feline pneumonitis in other species has not been demonstrated. It was originally suggested that the virus may be responsible for human pneumonitis,[4] and the possible relationship of the agent to benign lymphoreticulosis of man has been discounted by the recent report of Armstrong et al.[5]

The Clinical Disease

The clinical disease is manifest as an upper respiratory infection. Although a slight rise of body temperature may occur, this feature has little diagnostic significance. Infected animals may remain afebrile. The incubation period in experimental infection is six to ten days.[2] Increased lacrymation occurs which may become purulent, and at the same time a mucoid nasal discharge appears. There may be enlargement and reddening of the tonsils, although there is usually no enlargement of the cervical or submandibular lymph nodes. Sneezing and coughing occurs with the accompanying discharge of heavy, purulent material. Although severe cases may exhibit anorexia, appetite usually remains normal. Occasionally refusal of certain types of food and satisfactory consumption of others may be noted.

Thoracic examination is frequently negative. Tracheal rales and increased vesicular murmur of the anterior portions of the lung may be detected in severe cases. Although loss of weight may be evident in advance stages of the disease, it is not usually obvious in naturally occurring infections. The course is chronic, lasting from a week to a month with complete recovery requiring as long as six weeks to two months. Mortality rate is negligible unless secondary

infection occurs or some chronic condition is aggravated. Virus may be carried by the animal for several weeks or longer after clinical recovery.

Virus Morphology

The agent responsible for this disease condition, *Miyagawanella felis*, is a characteristic member of the psittacosis-lymphogranuloma group.[3,4] It has been estimated to have an approximate mean diameter of 423 mμ, as determined by examination with the electron microscope.[6] According to Rake and co-workers,[7] 51% of the elementary bodies measure between 440 and 490 mμ in diameter. The median diameter was found to be 465 mμ and the range from 350 to 580 mμ. Elementary bodies of the agent may appear in chains, pairs or clusters.

Moulder and Weiss[6] purified the virus by use of a system involving differential centrifugation of homogenized yolk sac preparations. Egg material was removed by celite adsorption and serologic precipitation. Subsequent electron photomicrographs revealed that relatively pure virus preparations were obtained. The elementary bodies were Gram-positive, resisting for at least five seconds decolorization with 95% ethanol.

Virus Stability

The agent of feline pneumonitis is moderately resistant to adverse environmental effects. Infected yolk sacs contain virulent virus for up to one month at 4 C. and at least six months at -70 C.[2] Complete inactivation does not occur at 45 C. for 30 minutes or at 50 C. for 10 minutes, but 60 C. for 10 minutes destroys the virus.

Purified virus preparations lose about 80% of their infectivity in 60 days when stored at -70 C. Half the virus is destroyed in 90 minutes at 37 C. Stability of virus at 0 C. is about equal, whether distilled water or phosphate saline buffer is used as the suspending medium. A pH of 6.5 to 7.5 is required for optimum stability.[6]

The susceptibility of feline pneumonitis virus to chemotherapeutic agents has been investigated by several workers.[10-19] Treatment of experimentally infected cats has been studied by McKercher.[20]

Effects of Antibiotics

Sulfonamides, which are effective against certain species in the psittacosis-lymphogranuloma group, generally are ineffective against the feline pneumonitis agent.[21-23]

Large doses of penicillin retard viral growth in experimental infections of chick embryo yolk sacs.[10,17] Rapid serial passage of the agent in yolk sacs containing penicillin G resulted in the development of a penicillin-resistant variant.[16] Thirty-three passages were required to develop full resistance, but subsequent passage without the presence of penicillin did not alter the resistant state.

Chlortetracycline and oxytetracycline have been proved effective in the treatment of experimental infections in mice.[12,13] Attempts to produce strains resistant to both these antibiotics using mice and embryos have failed.[14] Tetracycline antibiotics are much more effective than penicillin. McKercher[20] has demonstrated that both chlortetracycline and oxytetracycline are effective in the therapy of experimentally infected kittens. Penicillin and chloramphenicol are only moderately effective, and streptomycin shows no therapeutic value.

A contrasting report was presented by Erturk,[23] in which he indicated that streptomycin was effective against the agent, and suggested that it would be efficient in therapy, but he offered no clinical evidence to support this thesis.

Pathological Alterations

Conjunctivitis and acute inflammation of the mucosa of the pharynx and larynx usually are present. The nasal cavity may be inflamed and usually contains a moderate amount of yellow to green colored mucus. The lung may show a consolidation of the anterior lobes with heavy accumulations of mucus in the bronchi. Histologically, the alveoli and bronchi contain a typical inflammatory exudate of polymorphonuclear leukocytes and monocytes. Other organs are usually normal.

Weiss[24] described cellular pathology associated with development of feline pneumonitis virus in the lungs of experimentally infected mice. The developmental cycle of the virus in infected tissue is similar to that

of other members of the psittacosis-lymphogranuloma group. Initial bodies appear in the alveoli about 15 hours after infection, and the life cycle is complete in about 48 hours.

Vesicles containing large numbers of granules, presumably elementary bodies, appear about 24 hours after infection. These structures measure approximately 5 to 6 $m\mu$ in diameter, and are common during the first seven days of infection.

Fixed macrophages in the alveoli may contain virus. Virus inclusions also occur in the bronchiolar epithelium.

Diagnosis

Differential identification must be made from bacterial infections of the respiratory tract, respiratory manifestations of feline panleukopenia and inflammations following mechanical injuries. Complement fixation tests have been used in experimental infections employing a group specific complement-fixing antigen.

Recently,[25,26] species specific complement-fixing antigens have been studied. These alkali-soluble antigens were prepared from elementary bodies by sonic disruption. It is not yet known whether these preparations will have application in the clinical laboratory diagnosis of feline pneumonitis.

The absence of a severe leukopenia is an aid in diagnosis, together with a normal temperature curve and absence of enteric symptoms.

Mice can be used for isolation of virus. Baker[2] has reported that 10% suspensions of cat lung are satisfactory for demonstrating the presence of virus by inoculation of 3- to 5-week-old mice. Intranasal inoculations of 0.05 ml. will cause illness or death in mice in three to five days. In the clinical specimen, nasal washings or scrapings can be used.

Five-day-old chicken embryos die in two to three days following injection of the yolk sac and elementary bodies are easily demonstrated in smears of the infected yolk sac membranes. Isolations in embryonated eggs can be confirmed by passage to mice.

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Continued on page 38

CLINICAL REPORT

Clinical Evaluation of Methylprednisolone

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IN MY PRACTICE a number of cases of small animals suffering from chronic skin inflammations and joint involvements have prompted me to administer drugs orally. Recently, a new adrenocorticoid in tablet form, methylprednisolone (Medrol — Upjohn) has been evaluated on an investigational basis and has given maximum therapeutic effects with minimum side effects.

Medrol is a new prednisolone derivative with the generic name of methylprednisolone. It has three times the glucocorticoid activity of prednisolone, two times the anti-inflammatory activity and less tendency toward sodium and water retention. Speed of degradation is similar to that for prednisolone; the duration of plasma steroid levels following rapid intravenous injection are identical. This means that the effects can be expected to be as prolonged as for prednisolone. Methylprednisolone produces the same therapeutic effects as the parent substance, but at greatly reduced doses. This evaluation is offered as evidence of the great benefit it has given various patients, as well as the peace of mind it has given their owners — which is in no small way to be overlooked.

Case Reports

Case 1. Animal: 10-year-old Wire-haired Fox Terrier. Condition: Generalized chronic eczema of unknown etiology. History of failing to respond for several years. Therapy: Fleas were eradicated. Medrol, 4 mg. administered orally twice daily for four days until relief from intense pruritus was noted; then 2 mg. daily for maintenance. Results: Owner gratified with results. After four years of poor response to many drugs, there was vast improvement within a day.

Case 2. Animal: 10-year-old Persian tomcat. Condition: On stroking the dorsal thoracic area the animal was so startingly irritated that it went into generalized spasms. Previous *x*-rays had revealed an old thoracic vertebral fracture that had failed to heal normally and which apparently impinged on dorsal nerve roots. Treatment with injectable corticosteroids had been unsuccessful. Therapy: Medrol, 2 mg. orally twice daily. Results: Great relief, and the owners believe the pet has benefited tremendously, particularly inasmuch as previous steroid therapy had failed.

Case 3. Animal: 10-year-old Wire-haired Fox Terrier. Condition: Chronic cough, believed to be cardiac-asthmatic, associated with advanced age. Repeated negative smears for heartworms. Also slight ankylosis of right stifle joint, arising from an old injury. Therapy: Medrol, 2 mg., orally, twice daily. Had responded only slightly to antibiotics and cough syrups. Results: Immediate and complete relief of the cough in 24 hours. A slightly watery stool developed, but this disappeared when dosage was reduced to 2 mg. daily. Immediate relief from coughing was evident; also improved mobility.

Case 4. Animal: 16-year-old mixed breed male dog weighing 50 pounds. Condition: Chronic eczema due to heartworm infection and reduced kidney function. Mild albuminuria. Therapy: Medrol 4 mg., orally twice daily, then reduced to 4 mg. daily for maintenance. Results: Response was dramatic. Owners reported that within 60 hours the dog had ceased constant scratching. The animal looked and acted five years younger and even exhibited some evidence of increased libido.

Case 5. Animal: 10-year-old Cocker

Spaniel, male, weighing 20 lb. Condition: Dry eczema of possible allergic origin. Animal a house pet and owner much annoyed at constant scratching. Therapy: Medrol, 4 mg. orally, twice daily, Results: Scratching stopped immediately. After two days, maintained on 4 mg. daily. Mild diarrhea noted on second day, but disappeared quickly.

In the case reports presented above, clinical evaluation was made on the basis of individual cases alone, since it was impractical to maintain controls.

Summary

This new corticoid has been used on several other cases of eczema with hind-quarter weakness. There were no disappointing results on selected cases, and with the possible exception of transient diarrhea, no undesirable side effects. As with all other corticoids, there is the definite indication and need for continued methylprednisolone therapy once response is noted, inasmuch as recurrence of symptoms has been noted when the owner failed to administer the drug regularly or ran out of it temporarily.

Diagnostic Classification of Canine Skin Diseases

Speaking at the 34th Annual Missouri Conference For Graduate Veterinarians, Dr. C. W. Bower emphasized the importance of a return to basic diagnostic efforts in the confusing field of small animal skin conditions.

It is his experience that at least 85% of cases presented are not primary skin conditions, since the skin reflects the metabolic, endocrine and nutritional function of the animal. Animals exhibit the scratch reflex so common in humans. The desire to scratch often persists long after skin lesions are gone.

Dr. Bower classifies canine dermatitis as follows for routine clinical management.

Inflammatory—the direct result of irritation.

Pyogenic—bacterial infection is commonly secondary to an inflammation.

Parasitic.

Endocrine Imbalance.

Seborrhea—oily condition commonly associated with heavy carbohydrate diet. Saline laxative in the form of one teaspoon of dry epsom salts placed on the tongue plus good quality protein diet provide basic therapy.

Dry—frequently associated with nephritis. Good quality protein diet plus .5 to 2 gm. of dl methionine daily makes good basic therapy.

Self induced irritation — "hot spots." Proper cleaning and common drying agents such as powdered starch yield good results.

Photosensitivity — "Collie nose." Responds well to local application of steroid lotions or tincture of benzoin.

Allergy—flea induced sensitivity a major cause.

Parenteral steroid therapy is recommended only as a last resort since symptoms are masked without correction.

FELINE VIRAL PNEUMONITIS

Continued from page 36

21. Meiklejohn, G., Wagner, J. C., and Beveridge, G. W., Studies on the Chemotherapy of Viruses in the Psittacosis-lymphogranuloma group: I. Effect of Penicillin and Sulfadiazine on Ten Strains in Chick Embryos. *Jour. Immunol.* 54:1, 1946.

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Renal Disease of Dogs

Treated with Promethazine

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WHILE CHRONIC INTERSTITIAL NEPHRITIS is the most common form of kidney disease in dogs, a more acute syndrome, usually associated with a systemic infection, is sometimes seen. The author has observed 18 dogs exhibiting clinical signs and laboratory findings suggestive of secondary renal disease associated with alterations in renal function. Predominant clinical signs were stiffness and soreness of the legs, congestion of buccal mucous membranes and conjunctiva, malaise, occasional vomiting and varying degrees of anorexia. In most cases blood urea nitrogen was elevated to 30 mg. or higher, and urinalysis showed casts, bacteria, pus cells and proteinuria. Specific gravity of the urine varied from 1.010 to 1.035, and in ten patients the white cell count was markedly elevated. Edema of the extremities was noted in nine dogs.

Chart 1 illustrates clinical findings on these patients. A combination of symptoms and laboratory findings is usually necessary before an accurate diagnosis can be made.

Clinical signs all suggest acute nephritis associated with systemic infection, but research is necessary before the pathological and functional changes in the kidney can be interpreted.

Previously, combined antibacterial and antihistaminic therapy had been employed in treating these animals. A combination of penicillin and streptomycin was used as initial antibacterial treatment. For dogs that failed to show a rapid response, sulfamethoxypyridazine, was employed. Results of this therapy were usually disappointing.

Antihistamine therapy has been infrequently used for treatment of renal disease in animals. Craig *et. al.*,[1] however, reported that the use of an antihistaminic drug might shorten the course of acute nephritis in children. In human beings, nephritis may follow an acute systemic bacterial infection, suggesting the possibility that it may be in the nature of an allergic response to bacterial toxins. More recently, McCabe[2] reported that the antihistamine, promethazine, was of value in the management of the nephrotic syndrome in man. There is also clinical and experimental evidence that antihistaminic drugs can be an aid in relief of edema associated with nephritis and other causes.[3,4,7]

Drug Action

These observations, and the fact that some antihistaminic drugs are reported to have a mild diuretic effect, prompted the author to use promethazine (Phenergan — Wyeth) in the treatment of dogs for renal disease. Promethazine is a potent antihistaminic drug. Chemically it is a phenothiazine derivative, and, like the other phenothiazines (*i.e.* promazine, chlorpromazine), it may at times produce a quieting effect upon the patient.

The chemical action of promethazine in effecting reduction of edema and a favorable response in nephritis is not known, but several possibilities present themselves. It has been demonstrated experimentally that the drug opposes the increased capillary permeability induced by histamine.[5] It is possible that histamine plays an important role in the reduction of certain types of edema by increasing capillary permeability. This effect would seem most likely in those edemas associated with inflammatory, allergic or anaphylactic reactions. By decreasing capillary permeability, an antihistaminic drug might be expected to inhibit the collection of edematous fluid and mobilize edema which is present. There is some evidence that promethazine may decrease the permeability of cellular membranes to sodium.[6] If this theory is true, it may be presumed that the drug could decrease the renal tubular reabsorbtion of sodium. This reabsorption would produce a diuretic effect followed by a reduction of edema.

In a separate study,[7] however, it was demonstrated that promethazine produced an increase in water excretion without a concurrent increase in sodium excretion. This

finding suggests that the response is primarily a mild diuretic response and is unlikely to produce significant alterations in the electrolyte balance. It also indicates a suppression of the antidiuretic hormone, rather than tubular inhibition of sodium or chloride absorption, as is the case of mercurial diuretics.

A third explanation of the action of promethazine in producing diuresis, is that the drug may decrease inflammatory reactions in the kidney by inhibition of histamine. In renal infections it is reasonable to expect that increased amounts of histamine are liberated in the tissues, and that this liberation may have an important effect on renal function.

Mode of Action

Whatever the mode of action, combined therapy of antibiotics and promethazine was of value in the management of the syndrome described here. Within 48 to 72 hours after therapy was begun there was a disappearance of edema and a remission of other clinical signs. Associated with these changes, the urine returned to normal. The sedative effect of the drug appeared valuable in relieving pain and soreness.

Promethazine was used in oral doses of 25 mg., four times daily, for dogs over 40 lb., and in one-half this dose for animals under 40 lb. In most cases the drug was used for at least ten days. There were to apparent toxic or side reactions.

Summary

The use of an antihistaminic drug, promethazine, in combination with antibacterial therapy, is described in 18 dogs with a syndrome suggestive of acute nephritis. Promethazine in doses of 12.5 to 25 mg., four times daily, was of value in the relief of edema and other clinical signs associated with the syndrome. Several explanations of its effect are discussed.

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TABLE. 1

Breed	Age (yr.)	Albumin	Casts	Bacteria	Pus Cells	Specific Gravity	Urea Nitrogen	Water Ret.	W.B.C.
Cocker Spaniel	4	4+	+	+	+	1.018	40-50	slight	14,800
Doxey	6	2+	+	+	—	1.018	20-30	none	13,200
Doxey	5	3+	+	+	+	1.028	40-50	moderate	15,000
Doxey	3	4+	+	—	+	1.010	50-60	marked	17,900
Mixed Breed	10	1+	+	+	+	1.030	20-30	none	12,500
Roetweiler	2	4+	+	+	+	1.010	30-40	marked	19,500
Chow	7	0	—	+	+	1.030	20-30	none	11,200
Doberman	5	3+	+	+	—	1.018	40-50	none	10,000
Beagle	3	0	—	+	+	1.032	20-30	none	no count
Beagle	4	0	+	+	—	1.030	20-30	none	no count
Beagle	9	3+	+	+	+	1.018	40-50	slight	16,400
Coon Hound	7	2+	+	+	—	1.013	40-50	slight	15,200
Coon Hound	6	4+	+	+	+	1.010	50-60	marked	19,500
German Shepard	5	1	+	—	+	1.020	20-30	none	no count
German Shepard	10	4+	+	+	+	1.035	40-50	moderate	16,500
Crossbreed	8	4+	+	+	—	1.030	40-50	none	no count
Collie	5	2+	+	—	—	1.030	20-30	none	13,000
Crossbreed	11	4+	+	+	+	1.010	50-60	marked	20,000

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This study presents data collected during development and refinement of a modified live virus hog cholera vaccine. Clearly defined experiments show that even under conditions of stress the vaccine is safe and effective. This information was presented at the United States Livestock Sanitary Association Meeting in Miami Beach, Florida, November 4-7 and is published through the courtesy of that association. Complete presentation of all papers given will appear only in the proceedings Book of U.S.L.S.A., Dr. R. A. Hendershott, secretary.

Recent Studies on the Properties of a Nonvirulent Living Hog Cholera Vaccine

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THE PURPOSE OF THIS REPORT is to present a resume of experimental and field data obtained during the development and refinement of a modified, living virus hog cholera vaccine (Swivax — Pitman-Moore). These data support the view that this living virus is completely nonvirulent, while retaining the highly antigenic properties of the original, unmodified strain. Certain details of the experiments considered here either have been or are to be reported elsewhere.[1,2]

Experimental Results

Previous publications[3,4] have outlined the method by which modification of the virus was accomplished. The original strain was adapted to rabbits by making alternate passages in pigs and rabbits until, after several such passages, it could be maintained in rabbits without further transfer in pigs. During subsequent passages it gradually lost its virulence for pigs without undergoing any loss of antigenicity. It currently is maintained at a level of more than 400 consecutive rabbit passages.

Antigenicity. Table 1 shows that the vaccine initiates a rapid immune response. Of various groups of pigs challenged with virulent virus at daily intervals following vaccination, 43% (3 of 7) of the pigs were protected against challenge as early as two days following vaccination, 87% (6 of 7) by the third day, and 100% (7 of 7) by the fourth day and thereafter.

As shown in table 2, a remarkably high degree of immunity is induced with a standard 2 cc. dose of vaccine. In one instance, 12 pigs, averaging 200 lb. each were inoculated intravenously with 5 cc. per pound body weight of virulent virus (1,000 cc.) 78 to 91 days following vaccination. All of these pigs withstood this challenge which approximated 1,000,000,000 lethal doses of virulent virus.

Results of the experiments summarized in tables 2 and 3 illustrate that the vaccine is equally effective when used with, without or from one to four weeks following protective doses of hog cholera antiserum.

Deliberate attempts were made to determine whether the vaccine might induce untoward clinical effects or fail to induce an

TABLE 1. Rapidity of Development of Immunity Following Vaccination

No. of Pigs Tested	Days Between Vaccination and Challenge	Results of Challenge Remained Well	Died
2	0	0	2
2	1	0	2
7	2	3	4
7	3	6	1
7	4	7	0
2	5	2	0
2	6	2	0

immune response in pigs under conditions of artificial or naturally-occurring stress. For this experiment, one group of pigs given cortisone and two other groups with bacterial infection and verminous pneumonia, respectively, were used. The results (table 4) reveal that no change in clinical attitude developed in any of the various pigs following vaccination and that all of those vaccinated developed a satisfactory immune response. By contrast, all of the control pigs proved to be susceptible when challenged with virulent virus.

Field Evaluation

During early field use of the vaccine, (280 rabbit passages), under special license, an attempt was made to evaluate its effectiveness by circulating inquiries which, when completed, were sent to the United States Department of Agriculture for tabulation. Table 5 is a summary of these reports concerning 2,301 herds in which a total of 175,765 pigs were vaccinated. Reported losses from all causes after vaccination totaled 2,074 or only 1.179% of all pigs vaccinated. Although these results were entirely satisfactory, the number of rabbit passages have been increased to more than 400 to further assure the safety of the vaccine.

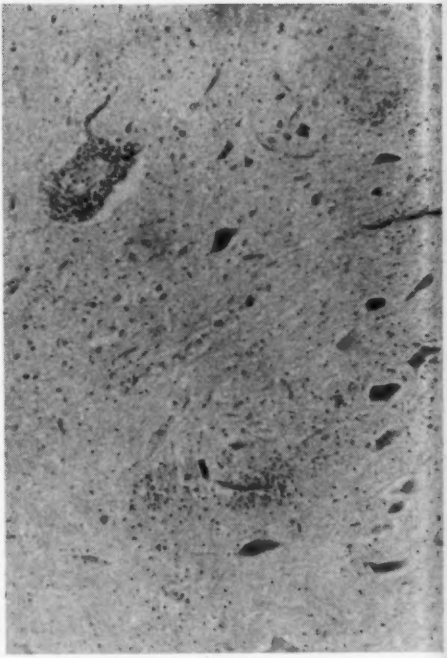


Fig. 1. Photomicrograph of brain of a pig with hog cholera. Note marked perivascular cuffing (upper left) and gliosis (lower center). Stain H & E x 80.

Histopathology

A technic for histopathological diagnosis of hog cholera has been described and evaluated in detail by Helmboldt and Jungherr,[5] who pointed out that virulent hog cholera virus almost invariably causes nonpurulent,

TABLE 2. Degree of Active Immunity Produced by the Vaccine with and without Serum, Demonstrated by Challenge after 78-91 Days with Various Amounts of Virulent Virus

No. Pigs	Dose of Vaccine (cc.)	Dose of Serum (cc.)	Dose of Challenge Virus No. of Pigs Receiving 2 cc.	10 cc.	5 cc./lb.*	Results No. of Pigs Remained Well	Sickened	Died
20	2	None	11	5	4	20	0	0
20	2	15	11	5	4	20	0	0
20	2	30	11	5	4	20	0	0
10	None	15	10	—	—	0	10	10
16	None	None	16	—	—	1	15	14

*This dose in 200 lb. pigs equals 1,000,000,000 lethal doses.

TABLE 3. Efficacy of the Vaccine at Different Intervals Following the Administration of Antiserum

Interval Between Serum and Vaccine	Results of Challenge			
	No. of Pigs Tested	No. Remained Well	Sick and Recovered	Died
Simultaneous	8	8	0	0
1 week	10	10	0	0
2 weeks	10	9	0	1*
3 weeks	8	8	0	0
4 weeks	8	8	0	0
Vaccine only	4	4	0	0
Serum only	6	1	1	4
No treatment	8	0	0	8

*Died six days after challenge; few lesions suggestive of cholera; hemolytic streptococcus isolated from spleen and heart blood.

The doses were as follows: vaccine, 2 cc.; serum, 35 cc., and virulent challenge virus, 2 cc. All pigs were challenged 75 to 83 days after administration of serum.

disseminated inflammatory lesions in the brain of susceptible pigs. These inflammatory changes occur also in the spinal cord. Similar microscopic lesions are not associated with common infectious diseases of swine, such as erysipelas, pasteurellosis and salmonellosis, although gross lesions seen in these diseases frequently are identical with those found in hog cholera.

In our laboratory this method has been found experimentally to be remarkably accurate.[2] It is now used routinely to support a differential diagnosis of hog cholera, particularly when virus isolation attempts in pigs are not made. Characteristic lesions of encephalomyelitis are illustrated by figures 1 and 2 which are photomicrographs made from the brain and spinal cord of a pig with hog cholera. Figure 3 is a photomicrograph from a normal pig, showing the same area of the brain that is depicted in figure 1.

With the knowledge that virulent hog cholera virus regularly produces disseminated aseptic encephalomyelitis, attempts were then made to determine whether similar lesions might occur in pigs killed at progressive intervals following vaccination

TABLE 5. Field Use of the Vaccine in 2,301 Herds

Total pigs vaccinated	175,765
Losses diagnosed as other than cholera	1,433 (0.815%)
Losses from undiagnosed causes	641 (0.364%)
Total losses from all causes	2,074 (1.179%)

Calculated from reports to USDA during period of special license.

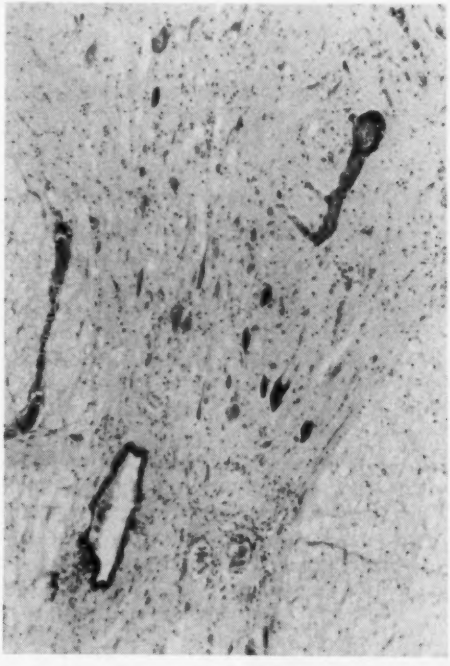


Fig. 2. Photomicrograph of lumbar spinal cord of a pig with hog cholera. Note perivascular cuffing in ventral horn (upper right) and generally diffuse infiltration of lymphoid cells into both the gray and white matter. Stain H & E x 80.

TABLE 4. Immunologic Response; Pigs Vaccinated* Under Conditions of Experimental and Naturally Occurring Stress

No. of Pigs			Clinical Attitude	
Controls	Vaccinated	Stress Factor(s)	Following Vaccination	Following Challenge
4		Cortisone	—	Susceptible
	4	"	No change	Immune
2		Bacterial infect.	—	Susceptible
	15	" "	No change	Immune
2		Verminous pneumonia	—	Susceptible
	20	" "	No change	Immune

*Vaccinated pigs received 2 cc. of vaccine. All pigs received 2 cc. of virulent virus 7 days later.

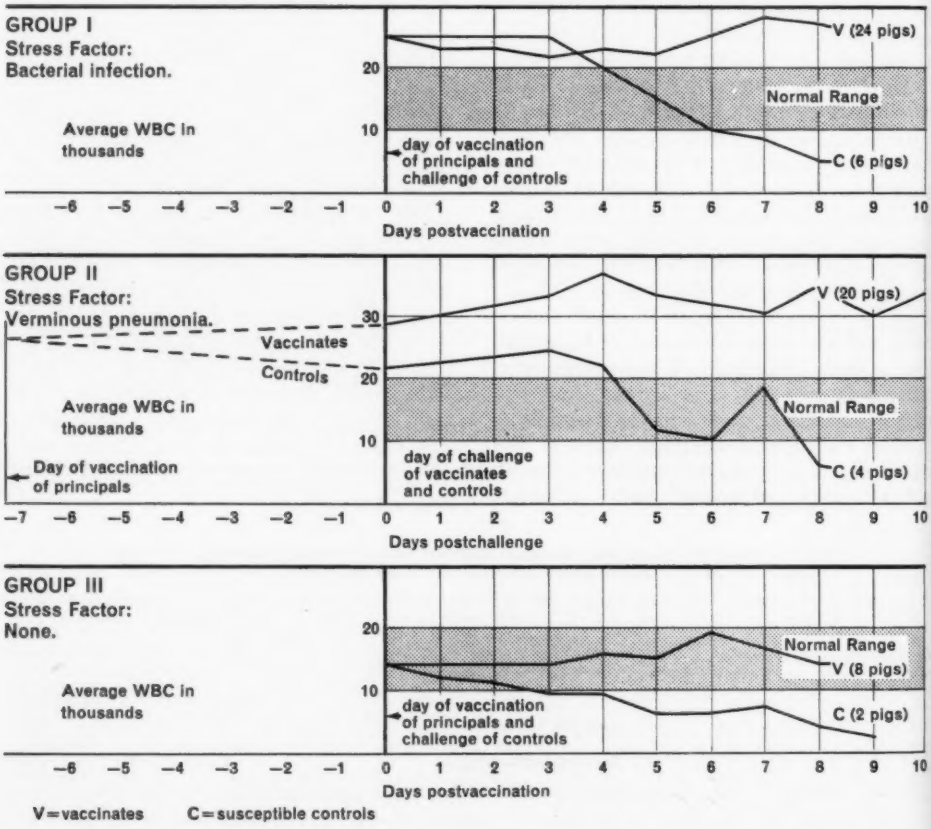
TABLE 6. Histopathologic Study of the Central Nervous System of Pigs Vaccinated under Conditions of Naturally Occurring Stress (Bacterial Infection and/or Verminous Pneumonia)

	No. of Pigs	No. of Days After Vaccination When Killed	CNS Lesions
Vaccinees:	2	4	None
	5	5	"
	3	6	"
	4	7	"
	5	8	"
	1	10	"
	1	12	"
	1	14	"
	2	16	"
		Number of Days After Challenge When Killed	
Controls:	2	7	Encephalitis
	2	9	Encephalomyelitis

with the modified, live virus vaccine. No lesions were found in a series of clinically normal vaccinated pigs. Following this, a series of two groups of pigs under conditions of naturally occurring stress (bacterial infection and verminous pneumonia) were deliberately used in a similar manner to determine whether stress might enhance production of microscopic lesions in the central nervous system (CNS). As is shown in table 6, no histological lesions were demonstrated in the CNS of any of 24 pigs killed variously between 4 to 16 days following vaccination. By contrast, lesions associated with hog cholera were demonstrated in each of the four controls challenged with virulent virus.

TABLE 7

Hematologic Studies of Pigs Vaccinated under Conditions of Naturally Occurring Stress, Compared with a Normal Group



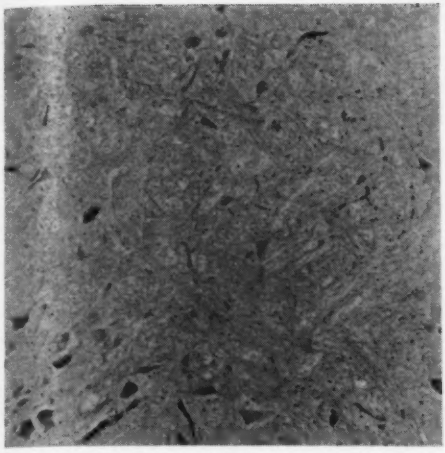


Fig. 3. Photomicrograph of brain of a normal pig taken from the same general area as that depicted in figure 1. Stain H & E x 80.

Hematology

Since leukopenia has been long considered a characteristic feature of hog cholera, absence of leukopenia might be regarded as a significant criterion in demonstrating lack of virulence of a hog cholera vaccine. To determine this point, three groups of susceptible pigs were used. One group was clinically normal. Two other groups, deliberately chosen because of conditions of naturally occurring stress (bacterial infection, verminous pneumonia), were used to determine if stress *per se* might enhance production of leukopenia. In the experiments summarized in table 7, leukopenia did not develop after vaccination, either in the clinically normal pigs or in those under stress. However, in all three groups the nonvaccinated control pigs developed marked leukopenia after administration of virulent hog cholera virus. The vaccinated pigs in groups 1 and 3, as well as those in group 2, proved to be immune upon subsequent challenge with virulent virus.

Absence of transmission of the virus vaccine from vaccinated to susceptible pigs in contact is particularly important from the standpoint of safety. As shown in table 8, the vaccine was not transmitted from vaccinated to susceptible pigs during a period of contact of 42 to 91 days.

Failure of the virus vaccine to revert to virulence is an important point. Since modification of the virus to its present nonvirulent form was accomplished by passage in rabbits, it is reasonable to question whether several reverse passages in the pig, the definitive host, might not induce reversion to virulence. To determine this point, 12 deliberate back-passages in two series of pigs were made. Two pigs, held in isolation, were used for each passage. As shown in table 9, the virus did not revert to virulence during these two series of 12 back-passages each.

TABLE 8. Nontransmissibility of the Vaccine During a Period of 42 to 91 Days of Contact Between Vaccinated and Susceptible Pigs

No. of Pigs	No. Receiving Vaccine	No. Receiving 15 to 35 cc. Serum	Results of Challenge with 2 cc. Virulent Virus	
			Number Inoculated	Number Deaths
126	126	84	126	0
54	None	16	54	51

Absence of persistence of the virus vaccine in the pig is another point in evaluating its safety. To determine if this high rabbit-passage virus might be harbored in the pig, two young susceptible litters were used. In one test using six-week-old pigs, four of a litter of nine were inoculated with 2 cc. of vaccine. Four weeks later blood and urine were collected from vaccinated pigs and injected into two additional groups of susceptible pigs. Pigs which were injected with blood and urine remained well and were susceptible to challenge with virulent virus six weeks later, indicating that neither modified nor virulent virus was present in the blood or urine of vaccinated pigs. When all of the original nine pigs were challenged with virulent virus ten weeks after the beginning of the experiment, the four vaccinated pigs remained well, whereas controls were susceptible.

In a second experiment with a litter of five-week-old pigs, identical results were obtained.

Safety and potency of the vaccine in pigs raised in a cholera-free area were determined by using a drove of pigs obtained from Canada, where eradication of hog cholera is practiced. Fourteen pigs were used to conduct a test for safety and potency in accordance with rules and regula-

TABLE 9. Back-passage of the Vaccine in Susceptible Pigs (2 Pigs Used at Each Passage Level)

Back-passage	Days Between Vaccination and Bleeding	Days Between Vaccination and Challenge	Results of Challenge
First Series			
1	7	9	immune
2	7	12	"
3	7	7	"
4	7	12	"
5	7	12	"
6	7	12	"
7	7	12	"
8	7	12	"
9	7	12	"
10	7	12	"
11	7	12	"
12	7	13	"
Second Series			
1	7	9	immune
2	7	10	"
3	7	13	"
4	7	9	"
5	7	16	"
6	7	18	"
7	7	17	"
8	7	16	"
9	7	10	"
10	7	11	"
11	7	15	"
12	7	18	"

Virulence of the challenge virus and susceptibility of the test pigs were demonstrated by challenging part of each herd.

tions of the USDA. In this test, 10 of the 14 pigs selected at random were vaccinated and observed closely for seven days, at which time the entire group of 14 was challenged with virulent virus. As illustrated in table 10, all vaccinated pigs remained well from the time of vaccination until the test was concluded two weeks after challenge, except for one pig which developed an erratic fever. This pig survived throughout the test period and was then killed for necropsy. Abscesses were found in the lungs and gross or microscopic lesions characteristic of hog cholera were not demonstrated. All controls developed symptoms of cholera following challenge, and either died or were killed when moribund. Three of these were examined in detail and all exhibited gross and microscopic lesions associated with hog cholera. The test was then judged by a USDA veterinary inspector to have satisfactorily demonstrated the safety and potency of the vaccine.

Discussion

For many years regulatory officials and others have sought the ideal instrument with which to effect the control and ultimate eradication of hog cholera. The highly contagious nature of hog cholera, its rapid spread in unprotected swine, and general uncertainty concerning possible reservoirs of virus in nature are well recognized. In view of these factors, programs employing quarantine and slaughter have not been generally favored in this country. Therefore, creation of an immune barrier to the disease by means of vaccination would offer a more realistic alternative to such drastic measures. This particular approach has been given considerable thought by a special committee of the U. S. Livestock Sanitary Association on the nation-wide eradication of hog cholera.[6]

It is generally agreed that a nation-wide vaccination program designed to eradicate hog cholera would need to exclude the use of virulent virus, a major source of infection. Although a killed vaccine is a safe vaccine, it has the disadvantage of inducing only short-term immunity and then only after a considerable lag-phase.[7] Killed vaccines in general are ineffective when used with serum. This has been clearly demonstrated with crystal-violet vaccine.[8] Consequently, a vaccine combining the immunological properties of a living virus with the safety of a killed virus appears to be ideal for the control and eradication of hog cholera.

It seemed worthwhile to evaluate data presented in this report by comparing results with a hypothetical vaccine that repre-

TABLE 10. Safety and Potency of the Vaccine in Canadian Pigs Raised in a Cholera-free Area

No. of Pigs	Vaccine	Clinical Attitude Following Vaccination	Clinical Attitude Following Challenge with 2 cc. Virulent Virus
10	2 cc.	No change	No change*
4 (controls)	None	—	Sickened and died

*One pig had an erratic fever following challenge. Necropsy showed lung abscesses, but no gross or microscopic lesions of hog cholera.

sents a theoretically ideal immunizing agent. This would be a modified, living hog cholera virus having the following antigenic properties: (1) produces a rapid immunity; (2) produces a high degree of immunity; (3) produces a long-lasting immunity; (4) produces immunity under conditions of naturally occurring stress; (5) produces immunity with a single small dose, and (6) produces immunity when used with, without or following hog cholera antiserum.

It would also have the following safety properties: (1) does not cause clinical signs of disease; (2) does not cause histopathologic signs of disease; (3) does not cause hematologic signs of disease; (4) does not spread from vaccinated to susceptible animals; (5) does not revert to virulence when deliberately "back-passaged" in the definitive host; (6) does not produce a carrier state, and (7) does not produce abscesses, anaphylactoid reactions, isohemolytic disease, or other untoward effects.

Data submitted in this report satisfy criteria for such a theoretically ideal hog cholera vaccine. Of special importance, perhaps, is the ability of modified vaccine to produce an immune response when administered with or without, or following antiserum, since the use of antiserum would be necessary in controlling epizootics. Equally important, however, are features of nontransmissibility from vaccinated to susceptible animals, and failure of this modified virus to revert to virulence when deliberately back-passaged in susceptible pigs. A word of caution may be in order, lest this report of the deliberate vaccination of pigs under conditions of stress be misinterpreted as a recommendation for using the vaccine routinely in herds of pigs which are in a state of general debility. These experiments sought to demonstrate certain characteristics of the viral vaccine that had not been clearly defined previously, and were performed in the known absence of virulent hog cholera virus, a condition that cannot, with certainty, be duplicated in the field. The evidence showing that the modified live virus produces no clinical, hematologic, immunologic, or histopathologic changes either in clinically normal or debilitated pigs is extremely important. It demonstrates conclusively the nonvirulent properties of this live virus vaccine.

Summary

Extensive laboratory and field studies demonstrated that a modified live virus hog cholera vaccine was safe and effective. These properties were more clearly defined by experiments which showed that even under conditions of stress the vaccine caused no clinical symptoms or gross or microscopic lesions, nor did stress interfere with the production of immunity. There was no interference with the immune response when serum was given simultaneously or at intervals of from one to four weeks prior to vaccination. The vaccine virus does not spread by contact, and does not revert to virulence upon deliberate back passage. Comparison with hypothetical standards for an ideal vaccine shows that the vaccine virus combines the immunogenic properties of a living virus and the safety of a killed-virus vaccine and is, in fact, nonvirulent.

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Guest Editorial

PROFESSIONAL STANDARDS

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AMERICANS ARE A MEAT-EATING and milk-drinking people. The nation is growing rapidly in population, and as prices and income go up people are becoming more and more discriminating as to the quality of the food products they buy.

This means livestock production is assuming an increasingly important position in the agricultural economy. Already more than half the total cash income received by farmers is derived from the sale of livestock and livestock products. For the last two years, it has been around 55% nationally.

The veterinary profession plays a vital role in helping farmers maintain the health of livestock and carry on a profitable livestock enterprise. But the most convincing sign of what the veterinary profession means to the livestock industry — as in any industry — is the economic value of it.

Value of Veterinary Service

In 1955, the Veterinary Service Committee of the American Veterinary Medical Association made a study to determine what a veterinarian is worth in dollars to the community in which he is located. The basis of the study was a poll of practicing veterinarians, who were asked to calculate the value of their services on the basis of how much the treatment of animals of economic value was worth to owners. For instance, if the veterinary services saved the life of the animal, the full value of the animal was credited. If a cow returned to the milking line ten days sooner because of the treatment, the value of ten days of milking time was credited. If the veterinarian felt an animal would have recovered just as quickly without treatment, no value was credited for services.

In its calculations, the Committee did not include the value for fees and charges made for the treatment of pet animals, because this value can not be calculated in dollars. Neither did the Committee include vaccinations, immunizations, and testing for tuberculosis and brucellosis, nor the value of the veterinarian as a counsellor on matters of health or other community programs.

After a careful analysis of the value of veterinary services to only those animals of computable economic worth, the Committee estimated that for every dollar a

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livestock owner spent for veterinary services, he received $5.78 return on his investment.

After reading the report of the A.V.M.A. survey, I asked one of our economists to do a little figuring to find out just what the veterinary medical profession is worth to farmers in New England and New York. According to his conservative estimates practicing veterinarians can take credit for saving at least 8% of the livestock production in 1955 in New York and in the states represented in the New England Veterinary Medical Association.

Based on the $1,000,000,000. cash receipts for livestock and livestock products in 1955, farmers in New England and New York received $80,000,000 of their income as a result of veterinary medical service. This does not include the incalculable value of previous years of veterinary counseling and preventive measures that have resulted in healthier, more productive livestock.

Challenging Problems

The record of service of the veterinary profession is one of which we can be proud. However, we can not rest on ancient laurels, for, in spite of the excellent job that is being done, we know that farmers are still paying a terrific toll to animal diseases and parasites. In a survey made by the Agricultural Research Service a few years ago, it was estimated that the losses from animal and poultry diseases and parasites amount to $2,700,000,000. annually.

It is true that as new knowledge is developed through research and is applied through regulatory programs and by practicing veterinarians and farmers, we are cutting the losses from some of the most serious diseases. For example, the losses from bovine brucellosis have been reduced from about $92,000,000. in 1947 to approximately $40,000,000. in 1957. We estimate that the losses are reduced about $9,000,000. each time the incidence of the disease is reduced 0.5%. We are greatly encouraged by the progress being made in the accelerated program initiated three years ago.

We are also within touching distance of our goal of complete eradication of bovine tuberculosis. The percentage of reactors found in tests has been below 1% since 1936, below 0.5% since 1940, and below 0.2% since 1948.

It is hard to measure progress when infection is at a point as low as this, but our records on slaughterhouse condemnations give a good indication. In 1953, 15,000,000 cattle were slaughtered under federal inspection, and 447 carcasses were condemned. In 1956, of 19,500,000 slaughtered, only 178 carcasses were condemned because of tuberculosis. So we are still making progress, although the job is getting harder all the time. Tuberculosis is still dangerous, but the incidence is low enough to be difficult to detect and stamp out. The situation calls for new technics and the most careful watchfulness of veterinary inspectors, practitioners, and producers.

It is not too much to hope that the time will come when we will have stamped out both brucellosis and tuberculosis—two of the long-time enemies of livestock farmers.

Economic Losses

These are not our only worries by any means, however. Farmers are plagued with a host of other diseases. Some of them are old. Some are new, or at least new so far as positive diagnosis is concerned. Mastitis costs cattlemen about $225,000,000. every year; vibriosis $137,000,000.; cattle and sheep scabies, another $6.500,000. Leptospirosis costs $110,000,000. and seems to be taking an additional toll each year. We also have the new cattle diseases, known as the mucosal complex, which include virus diarrhea and infectious rhinotracheitis. We are only beginning to get an idea of the seriousness of these disease conditions.

We all know that the problems of controlling animal diseases are enormous. It takes constant effort, hard work, and ingenuity to cope with them.

Certainly no group is more important in this effort than the veterinary profession. The scientific knowledge and skill possessed by the trained veterinarian place on him a great and specific responsibility, and because of this responsibility, it becomes of paramount importance that professional standards be maintained by every veterinarian in all phases of service activities.

Professional Standards

I believe there has been a significant change in the standards of the profession during the years that I have been a veterinarian. I must admit, of course, that from the viewpoint of those who have 40 or 50 years of professional life behind them, my 15 years are rather brief.

During this period there has been a rapid increase in the total number of veterinarians and in the percentage going into private practice. The increased demand for veterinary education has made it possible for schools to be highly selective in the admission of students, and an increasing percentage of those admitted already have bachelor's or even advanced degrees.

There has been a real gain in mutual understanding and cooperation between the veterinary, medical and dental professions. This is certainly true at the national level between professional groups in government and in professional organizations. And I assume it is equally true at the local level, between practitioners in veterinary and human medicine. Our close relationships with the other medical professions in our civil defense planning have undoubtedly contributed a great deal in this respect.

One of the results of the rapid increase in numbers of veterinarians and the slightly less attractive practice conditions has been increased availability of veterinarians for positions in state and federal governments — in teaching, research, and regulatory work. This is fortunate for the governments, because of the increased emphasis being placed on animal disease research and control and eradication activities.

For example, the Plum Island Laboratory for the study of foreign animal diseases has been constructed at a cost of approximately $10,000,000. We are now in the process of developing a research and regulatory service laboratory at Ames, Iowa, for the study of domestic diseases, at a cost of some $16,000,000. There has also been expansion in animal disease research facilities at several of the state land grant colleges, as well as diagnostic laboratories by state animal disease control organizations. Current expenditures for the brucellosis control and eradication program are running in the neighborhood of $40,000,000. a year, slightly more than half of which is coming from the federal government.

So, I think we will agree that there is quite substantial support for animal disease research and control and eradication programs, both state and federal.

All these developments have a direct influence on the veterinary profession and on its standards.

In evaluating these, I would like to consider the three characteristics that are part of the professional life of every veterinarian. These are ethics, professional service, and professional standing.

Ethics

During my membership in the profession, discussions have waxed long and eloquent with regard to ethical procedures. This has been all to the good and has brought greater recognition to the matter of ethical behavior.

Ethics has been stressed in the schools and colleges, but, as in all things human, practice is not always as simple as theory. As one of our leading deans has pointed out, young graduates entering practice after having been instructed in school as to proper professional ethics, sometimes observe unethical practices on the part of established colleagues. Such a situation is disillusioning to the recent graduate who may be tempted to follow the bad example set by older colleagues. Here is an area in which committees on ethics, grievance committees, and committees for reconciliation of disputes can perform a valuable service. And they have done so.

Ethics, of course, consists of a great deal more than letterheads, telephone book listings, and display signs. It is a gauge of our professional behavior and of the profession's maturity.

Professional Service

Professional service means services rendered. These services consist of diagnosis, surgery, treatment, dispensing of drugs, and health counseling. They can be performed only by those who have the training and skill that go with professional understanding and practice.

Let us consider for a moment one of these

services — the dispensing of drugs — and its relation to ethics. Unlike the physician, who writes prescriptions to be purchased over the drug counter, the veterinarian does a great deal of direct dispensing. The dispensing of drugs is inseparable from veterinary practice. The nature of the work requires that it be done. But the point at which the sale of medicants ceases to be dispensing and becomes merchandising, or selling, is a much debated question.

Most veterinarians will agree that dispensing should be based on diagnosis, and that, once a diagnosis has been made calling for medical treatment, it is certainly ethical for a veterinarian to sell the prescribed medication. Most will agree too, that when a veterinarian advertises medicants through the use of large displays in reception rooms and office windows, in newspapers, and even by farm-to-farm peddling in the manner of the old "general store" huckster, he is going beyond dispensing and is, indeed, merchandising.

This kind of merchandising is obviously in violation of professional standards. But the problem is not so clear cut as it sounds. For example, some veterinarians say that when they do not merchandise and sell, their clients simply go to feed stores and drug stores and buy medication and do their own administering. If livestock and pet owners can not buy from veterinarians, it is argued, they will go where they can buy.

It seems to me that this same argument could well apply to a great extent to physicians. All of the drug stores have ample quantities of patent medicines, proprietaries of one kind and another, but the physician has not found it necessary to merchandise these products in competition with the drug stores. Of course treating or administering medicine to animals is an entirely different matter from giving medicine to human beings. But I believe that the soundest thinking, wisest, and most experienced veterinarians are agreed that a veterinarian is not going to overcome competition from feed stores and drug stores by outmerchandising them. If the practice of veterinary medicine is ever reduced to such a state of competition, it will be the result of our failure as a profession to maintain acceptable standards in our professional services — whether they be diagnosis, surgery, dispensing drugs, or health counseling.

I realize that conditions in different parts of the country vary, and that it would be impossible to lay down a rigid rule that would be equally applicable for all areas.

Veterinary practitioners who base their success on ethical behavior and high quality professional service are, in my opinion, the ones that are largely responsible for the great improvement in general standing or recognition of our profession during the last 15 years.

Professional Standing

This brings us to the third characteristic mentioned earlier — professional standing. Undoubtedly, a great deal of the recognition has come from the public relations programs that have been carried on with increasing intensity over the last 20 years. We owe a vote of deep gratitude, for example, to Associated Veterinary Laboratories, Inc., for their pioneer work in this field and for their continuing efforts.

The public relations program of the A.V.M.A. has been steadily broadened and improved. The many state and city associations have concentrated, too, on good public relations through the use of radio, newspapers, and television. I am sure millions of people learned something about veterinarians and veterinary medicine from the national network program, Noah's Ark.

There is much evidence of increased recognition in universities, in government, and in communities throughout the country. The academic rank of the school or college of veterinary medicine, in relation to other institutional segments, has steadily improved at most of our universities. The contributions of faculty members have also been important, as well as the higher quality and training of students admitted.

In government, evaluation is based primarily on the quality of the service performed. And I believe everyone would agree that the accomplishments of government veterinarians — in animal disease control and eradication, meat inspection, public health, and food inspection and other activities to safeguard the health of our armed

forces — have been outstanding.

The quality of the general service performed and the standards maintained by veterinarians determine the opinions of the profession held by livestock producers and the general public. Integrity and complete honesty are of paramount importance. The one veterinarian who submits blood samples for a whole herd by drawing the blood from only one cow may get by for a time. But eventually those animals will be checked again. And when occurrences like this come to light the individual veterinarian and the profession receive a black mark that is hard to erase.

The certification of the health of animals for interstate and international movements is not always taken as seriously as it should be. This work must be performed by a veterinarian, because no one else is capable of evaluating the health of an animal. But even the veterinarian must see the animal before he can certify its health. And apparently some health certificates have been prepared without the benefit of an examination of the animal covered by the certification. Such practices do not add to the stature of the individual or of the profession.

Undoubtedly, the fine work of small animal practitioners has contributed a great deal to recognition through services to people who have no other contact with members of the profession. This is especially true of practitioners in metropolitan areas. A number of small animal practitioners are members of medical college staffs, which is ample evidence of their professional recognition by their medical colleagues.

I am confident that real progress has been made in all aspects of professional standards. As we have developed and matured, we have been charged with additional responsibilities and provided with additional knowledge and tools with which to perform our services.

These added responsibilities — and the recognition of our ability to carry them out — place on our profession the honor and the obligation to merit them. We appreciate the honor and recognize our obligation. By adhering strictly to ethical principles, by rendering high quality professional services, by striving constantly to raise our professional standards, the future of the veterinary medical profession is assured.

Sex Determination for Cattle

In cattle, maleness is determined by the possession of an unequal pair of sex chromosomes (X Y), and females are characterized by an equal pair (X X).

Since the Y chromosome is smaller than the X, male-determining spermatoza should be slightly lighter than female-determining ones which carry the X chromosome.

It is possible to achieve partial separation of fractions differing minutely in weight by the use of a centrifuge, but the difficulty in working with living material is that it may not survive such treatment.

Some Swedish results suggest that by the use of sufficiently low centrifuging speeds, this trouble may be overcome.

One experiment, using the fraction deposited when spinning at 1,100 r.p.m., produced 11 calves out of 23 inseminations and all of them were males.

More recently 142 inseminations were performed with semen samples spun at 1,000 and 1,100 r.p.m. and 63 calves were produced, a figure that compares unfavorably with the conception rate of 60.5% in the control group.

The sex ratio of 36 males and 27 females does not differ significantly from that normally observed in cattle. However, when the cows used in this experiment were grouped according to their fertility, the sex ratio in the more fertile group was 28 females to nine males. In the less fertile group this was reversed, and the results were eight females and 18 males.

The difference in sex ratio between these two groups was significant. It is suggested that the lower fertility may be due to mechanical damage of the spermatazoa during centrifugation and that the female-determining fraction is more sensitive.

This explains the absence of female calves in the first experiment and the difference in sex ratio between the high and low fertility groups in the second. — *Dairy Farmer, October 1958.*

Marketing Agreement Hearing Held

A recessed public hearing called by the United States Secretary of Agrculture under the Anti-Hog Cholera Serum and Virus Marketing Order reconvened in the federal court house in Chicago December 1. This hearing affords interested parties an opportunity to submit evidence on proposed amendments to the Hog Cholera Serum and Virus Marketing Agreement prior to action by the Secretary.

The Anti-Hog Cholera Serum and Virus Marketing Order was established in 1935 as a result of congressional action. The objective was to insure maintenance of an adequate supply of serum and virus by regulating the marketing of these products in interstate and foreign commerce; to prevent undue and excessive fluctuations, unfair methods of competition and unfair practices. The need for protection of the public interest was based on past occurance of severe shortages in the face of epidemic hog cholera and resultant unscrupulous sales practices during such emergencies.

To carry out the objective of the marketing order, the secretary of agriculture was enpowered to enter into marketing agreements with manufacturers and others engaged in the handling of the products involved. In brief, the proposed amendments now under discussion deal with changes which would prohibit ownership of wholesalers and manufacturers of hog cholera products by practicing veterinarians and certain other groups recognized as dealers under the marketing agreement. It is proposed that farmer cooperatves be an exception due to their consumer status and special consideration afforded them by congressional legislation.

Coordinated Group Action

The Physicians' Business Bureau, with the approval of the Academy of Medicine of Cincinnati, is making its services available to all professional organizations and individuals who are servicing the public in the allied medical fields.

Included are services such as telephone, credits, collections, and professional management.

Poultrymen Honor Doctor Tucker

Dr. Frank C. Tucker, received the Indiana State Poultry Association's Golden Egg award at its 40th annual convention at Purdue University reecntly. Doctor Tucker was cited for outstanding service to the industry. The citation paid particular tribute to his work in his diagnostic laboratory and his assistance with the Mentone egg show.

Stanley Barker, past president of the Association, made the presentation.

Research Fellowships Available

The Ralston Purina Research Fellowships for 1959-1960 will be open to students at the University of Alaska, as well as to students of land grant colleges throughout the United States and three agricultural colleges in Canada.

Under the program, ten outstanding agricultural college students will be able to do graduate work. Application blanks and rules of the annual program are now being sent to the colleges. This is the first year the University of Alaska has been included in the program.

Three Fellowships will be awarded in animal husbandry, three in dairy husbandry, three in poultry husbandry and one in veterinary science. Each Fellowship amounts to $1,800.

Treatment for Psittacosis

Psittacosis in parrots has been treated with the tetracyclines in the past, but the 14 to 20 injections required have invariably proved highly destructive of breast muscle. Dr. Morris Pollard, School of Medicine, University of Texas, has solved the problem by suspending chlortetracycline hydrochloride in sesame oil instead of water. Only two 166 mg./kg. injections of the new suspension were necessary to eliminate a naturally occurring infection in 93 parrots. The regimen is also effective in parakeets. —*Medical News, November 3, 1958.*

Poultry Disease Prevention

Recent studies on the effect of terephthalic acid on Aureomycin chlortetracycline in chickens indicate that terephthalic acid boosts the effectiveness of the antibiotic fourfold in controlling synovitis. The effect is derived from the terephthalic acid's ability to increase the blood concentration of Aureomycin so that less than the usual recommended level of the antibiotic was able to control the disease.

Limited experiments have been conducted with terephthalic acid and Aureomycin for controlling PPLO. Preliminary reports indicate that the combination has promise.—*Dr. Damon C. Shelton.*

The Intraocular Lesions of Hog Cholera

In a study of dogs affected with canine distemper, Jubb, Saunders and Coates (1957) found that the virus invaded the retina and elicited degenerative and inflammatory changes.

In an attempt to determine whether invasion of the intraocular tissues is an attribute of others viruses which cause encephalitis, observations were extended to hog cholera.

Intraocular inflammatory changes were found in a histologic study of natural and experimental cases of hog cholera. The lesions were chiefly retinitis and anterior uveitis; in a few cases choroiditis was present as well.

The hog cholera virus, like canine distemper, is a pantropic agent localizing in and damaging many tissues of the body. Some of the damage that it wreaks in the eye in not unlike that occasioned in the central nervous system. This is of special interest because of the common pattern that is apparently emerging. Rabies, distemper, Borna encephalitis and hog cholera, cause encephalitis and concurrently cause degeneration or inflammatory changes in the eye, especially the retina. It may well transpire that intraocular damage is a general characteristic of such agents.—*Jour. Comp. Path. and Therapeutics, 68:375, 1958.*

Latest On Sterile Milk

A quart of Wisconsin milk can be processed into a sterile concentrated product and shipped a thousand miles or so and sell for less than 20 cents in far off grocery stores, according to University of Wisconsin researchers.

Processing cost figures developed by James Riekens and L. C. Thomsen show that the concentrate would cost 14½ to 15½ cents per one-third quart as it left the processing plant. One-third quart is enough to mix with water into one quart of fresh-tasting whole milk.

Transportation to such areas as New Orleans would bring the cost up to 16 or 17 cents per can. To this would have to be added the grocer's profit margin.

The exact store price would depend on the cost of milk and the operating margins desired by the processor and producer. In their figuring, Riekens and Thomsen used a price of $3.98 per hundred for fresh milk, the average Chicago price three years ago.

Aside from raw milk, the biggest processing cost will be for containers, the researchers found. Tin cans needed for sterile concentrate cost almost 1½ cents each.

Potential profits with sterile concentrated milk processing compare well with profits from other types of milk handled, Riekens and Thomsen say.—*Farmer's Digest, October 1958.*

Animal Health

R. R. DYKSTRA, D.V.M.

Cysticercosis

We have a communication from a former student — not a veterinarian — in which he states that he has muscle pains, and that his condition has tentatively been diagnosed as cysticercosis. He asks for the exact meaning of this word. We told him that in its broad sense the word means that the larval form, that is the bladder-like cyst of the tapeworm — usually either the *Taenia saginata* in the muscles of the bovine, or the *Taenia solium* in pork muscle — gains entrance to the human digestive tract and develops into the mature tapeworm.

Entrance is possible when infested beef or pork in a raw or incompletely cooked condition is eaten by a human being. For complete biological development, tapeworms must first reach the muscle of the ox or pig. In human intestines, the tapeworm grows and deposits ova which are in turn passed out with excrement to possibly soil vegetation. Ova are then consumed by grazing animals, and passed from the intestines by means of the blood stream. Ultimately the larval bladder-like cyst is again in the animal's muscles ready for further development. Any human being eating raw or incompletely cooked meat is susceptible. This is the normal complete life history of the tapeworm.

Cysticercosis in a narrower or restricted sense means that a mature tapeworm is in the intestines of a human being and is depositing ova. Normally these ova pass out with excrement, but occassionally some of the ova are in ingesta regurgitated into the mouth, reswallowed by the human being, and by means of the bloodstream reach muscle tissue, where they develop into bladder-like cyst. There they remain because human muscle is not eaten (except by cannibals). During its more or less permanent abode in the human muscle it causes muscle pains which are sometimes severe, and may even result in convulsions if many of the bladder-like cysts are present. This, then, is *cysticercosis* in its restricted sense.

Progesterone and Fertilization

Several research workers have during the preceding decade reported on death of bovine embryos shortly after are apparently normal fertilization. The first evidence of embryonal death is that the animal again shows evidence of estrus, and is then classed as a "repeat breeder." Embryologists inform us that the secretion of a hormone — progesterone — by the corpus luteum normally prepares the lining of the uterus for implantation of the fertilized ovum by the secretion of uterine milk. If there is no limited progesterone secretion there will be insufficient "uterine milk," and fertilized ovum is not implanted with its resultant death and reappearance of estrus.

At the University of Idaho, Johnson, Ross, and Fourt, under controlled conditions gave intramuscular injestions of reposital-type progesterone (100 mg.) on the second, third, fourth, sixth, and ninth day after the first breeding only. Control animals were not injected.

The result was 70 conceptions from 97 services in the treated group. In the control group there were 69 conceptions from 128 services. Progesterone seemed to have species specificity. Service and fertilization in rats were not influenced by comparable injections. The human female does seem to respond to the action of progesterone.

Cattle Tuberculosis

In an effort to stamp out "lingering cases of tuberculosis in Georgia cattle herds," all cattle in the state found to be infected will be condemned and slaughtered, it was announced by the commissioner of agriculture recently.

Owners will be prohibited from placing livestock on land where an infected herd has grazed for a period long enough to preclude the possibility of new infection.

Poultry Practice

W. R. HINSHAW, D.V.M., Ph.D.

Transplant of Cornea from Chicken

According to a news item in *The Japan Times,* successful transplanting of a chicken's cornea into the eye of human is reported by Dr. Ichiro Kamata, of Keis University. He claims to have made the transplant in November 1956 upon the right eye of a 54 year old factory engineer. Success is established by the fact that 20 months after the operation there has been no sign of deterioration, and that vision has improved to the extent that it is now the same in both eyes. According to the report, this is the second time that this type of transplant has been successfully made at Keis University.

Listeriosis in Turkeys

Listeriosis has been reported in numerous species of mammals and birds. As far as is known, however, the first cases to be reported in turkeys are those recorded by Belding and Mayer (*Jour. Am. Vet. Med. Assn.*, 131:296, 1957). The turkeys in one outbreak described by them were 18 weeks of age and exhibited neurological disturbances characterized by torticollis and coarse tremors of the skeletal muscles. Profound depression developed rapidly and death occurred in a few hours. These signs resemble more nearly those seen in mammals than have been recorded for other avian species. In the second flock no antemortem signs were observed. Necropsy observations in affected turkeys did not reveal massive necrosis of the myocardium which has been described as a distinctive lesion in infected chickens.

Listeriosis does not seem to be a common disease of fowl, but no doubt many cases are overlooked by failure of diagnostic laboratories to recognize the disease, or to make routine attempts to isolate *Listeria monocytogenes* from birds. The reader is referred to Biester and Schwarte, *Diseases of Poultry,* — 3d ed., 1952, page 403, for a complete discussion of this disease as it affects birds.

Animal Diagnostic Laboratories

A new Manual and Directory of Animal Diagnostic Laboratories in United States has been published by Laboratory Services, Animal Disease Eradication Division, Agricultural Research Service, USDA, Washington, D. C. In the "forward" of this May 1958 edition, the following statement concerning the purpose of the manual is presented.

"This manual represents an initial effort to meet the need that has existed for some time for a Directory of Animal Diagnostic Laboratories in the United States. It is hoped that this publication will be useful to Federal and State animal disease control officials, diagnostic laboratories, and practicing veterinarians as a complete, constantly current source of information on animal diagnostic services available in all sections of the country."

Important features of the manual are a complete list by states of diagnostic laboratories with the names of directors and a map showing their location; a list of the facilities and services of the laboratories arranged by diseases; and a section on factors governing movement of diseased tissue specimens, cultures, vectors, and restrictive materials. The directory includes federal, state, commercial and private laboratories, and should be a valuable addition to source libraries of many agencies and to practicing veterinarians.

The manual is furnished in a convenient loose leaf binder in order that revised pages can be added. Periodic revisions of subject matter, as well as additions and corrections will be sent to those on the mailing list.

Books reviewed in this department and any other books, if available, may be obtained by remitting published price to the Book Department, VETERINARY MEDICINE, Suite 803 Livestock Exchange Building, Kansas City 2, Missouri.

Practitioner's Bookshelf

TEXTBOOK OF VETERINARY FOOD CONTROL *(Lehrbuch der Tieraerztlichen Lebensmitteluebervachung)*, by *M. Lerche, H. Rievel* and *V. Goerttler;* 3rd edition, 1078 pages; 670 illustrations, 15 colored photographs. Verlag M & H Schaper, Hannover, Germany, publisher, 1958. Price—$33.00.

The third revision of this book was in the process of printing in 1943-45, but type and plates were destroyed in the war. Immediately thereafter, the authors—leading authorities in veterinary food control—started preparation of this third enlarged revision. To permit more thorough and extensive treatment of material presently included in text, milk and dairy products have been eliminated from this revision. All other foods derived from food producing animals are included in this book.

Meat and meat food products—fresh, chilled, frozen, canned, cured— wild animals, poultry, eggs, fish and crustaceans, are discussed in detail. Special emphasis has been placed on the bibliography at the end of each subchapter and chapter. These are very extensive and include all pertinent references on subject material. This comprehensive, well written, fully illustrated and authoritative text amply supported by carefully selected numerous references merits the attention of all veterinarians engaged in teaching, research, administration and operation of modern veterinary food hygiene and control.

YEARBOOK OF AGRICULTURE, LAND, 605 pages. Government Printing Office, Washington 25, D. C. Price — $2.25.

This book has 67 chapters and is well illustrated. It is written by 93 authorities, who tell in nontechnical language how the American domain was acquired; its importance in history; the extent and values of Indian, state, and public lands; uses and problems in Alaska, Puerto Rico, and each section of the continental United States; forested lands; and the acquisition of land for military purposes, highways, subdivisions, and airports.

Also included are topics such as the economic aspects of land tenure, types of ownership, valuation, appraisals, credit, insurance, buying and selling property, taxes, effects of farm programs, individual rights to control land, conservation, the real estate market, and income from farmland.

The practitioner who deals with livestock interests, farmers, and is concerned with large animal health would find this an important addition to his library.

THE MAMMALS OF NORTH AMERICA, by *E. Raymond Hall* and *Keith R. Kelson;* 1,300 pages, 500 maps, 724 drawings; 2 vol. The Ronald Press, New York, N. Y., Publisher. Price—$35.

Over 200 years of scientific research and scholastic achievement have gone into the

publication of this book. In 1758, when *Systema Naturae* was first published, the binomial system of nomenclature in naming animals was first used. The present work is a direct descendent, bringing up to date the vast knowledge accumulated about the free living mammals ranging from Greenland to Panama.

In more than 1,300 pages all of the 3,800 named kinds of North America mammals are described and classified in detail. The arrangement of the various orders and their sub-groups is in evolutionary sequence, starting with the Marsupialia and ending with the Artiodactyla. For each subspecies there is a citaion to the original description, to the first usage of the current name combination, to primary synonyms, and also a list of marginal record stations of occurrence. There are diagnoses for all taxonomic categories above subspecies, and keys to aid in the identification of species.

Wholesalers Form Organization

A new organization to be known as the National Veterinary Wholesalers Association has named C. Guy Stephenson as president. The organization was created during the recent A.V.M.A. meeting in Philadelphia and is comprised of businesses that are independently owned and sell to veterinarians. Associate memberships will be offered to all concerns selling in the veterinary field.

At the A.V.M.A. meeting in Philadelphia the delegates of the various groups met and the following officers were elected for the coming year: C. Guy Stephenson, Goshen Laboratories, Inc., Goshen, New York, president; Carl Sutton, Albany Serum Co., Albany, Georgia, vice president; George C. McConnell, H. C. Burns Co., Oakland, California, secretary; Leo Lindauer, Central City Chemical Co., San Francisco, California, treasurer.

C. Guy Stephenson, who heads the new group, has been president and board of directors member of the American Veterinary Exhibitors Association.

Piperazine Citrate

The following correction should be made in the article, Effect of Varying Doses of Piperazine Citrate on Puppies (*Vet. Med.*, 53:609, 1958): In the column under 7 gr./5 lb. (table 1.) the total for treated should be 123, not 113.

Livestock Loss Prevention Year

National Livestock Loss Prevention Year designates a nationwide effort to reduce today's livestock losses from diseases and parasites. The program is to be publicized through the cooperation of farm journals, radio and television stations, newspapers and leading livestock associations, and is being sponsored by member companies of Associated Veterinary Laboratories.

The coast to coast campaign will have two major objectives. It will focus farmer attention on major causes of livestock losses and emphasize the role of the veterinarian in preventing these losses.

One or more of the major disease, parasitic or nutritional problems will be emphasized each month. The farm press and radio-TV stations will cooperate in telling the public about pneumonia enteritis complex and ketosis in January; baby pig losses and lumpy jaw in February; nutritional diseases in April; swine erysipelas and accidental poisonings in May; internal parasites and clostridial infections in June; pinkeye and lungworms in July; leptospirosis in August; shipping fever and plant and forage poisoning in September; brucellosis in October; mastitis and winter scours in cattle in November; and infertility-sterility and external parasite problems in December.

More information on the program and its implications is available from Associated Veterinary Laboratories. Reports on the progress of Livestock Loss Prevention Year will be carried in this journal from time to time.

Armour Personnel Changes

Several personnel changes, including the appointment of two divisional sales managers have been announced by the Veterinary Department, Armour Pharmaceutical Co., Kankakee, Illinois, at the department's recent sales conference.

Winston G. Granger was named a division manager in charge of sales west of the Mississippi River. Mr. Granger will headquarter in Minneapolis.

Thomas E. Hare was appointed division manager of sales east of the Mississippi. He will headquarter in Philadelphia.

Harry W. Bamman was named assistant sales manager with headquarters in Kankakee.

V. J. Holderby was assigned the sales territory in Los Angeles and southern California.

William R. Minder has joined the Company as a veterinary representative with headquarters in Mendota, Illinois. He will call on veterinarians in the northern part of the state.

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John A. Ross was appointed specialty representative with headquarters in Minneapolis. He will handle only Armidexan, the iron dextran complex for baby pig anemia. His territory is Minnesota, Wisconsin, North and South Dakota.

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Distaff

MRS. E. F. (HAZEL) EBERT

Wives of veterinary students at Missouri University are being shown some fundamentals about use of the microscope by Mrs. Ebert.

I will never forget how scared I was in school the first time I was given a compound microscope to use. Before we were sent to use the instruments we were given a lecture on the way they were to be handled, how expensive they were, how easily the lens could be ruined, and how careful we must be in keeping them clean. The two unforgiveable sins were: to leave a dirty lens, and not to put the microscope in its case.

The simple microscope has a single lens set in a frame. In this instrument the rays of light which enter the eye proceed directly from the object. The most powerful simple microscope has a magnifying power of twenty diameters, which means the object appears four hundred times larger.

The compound microscope requires an objective and an eye piece mounted in a draw tube. Accurate focus in the case of high power lenses are attained by a special screw appliance known as the fine adjustment. There is also a large screw at the head of the arm for course adjustment.

The eye-piece and the objectives are the magnifying parts of the microscope. There are usually three objectives for different usage, high power, low power, and immersion lens to be used with oil or water. Never touch the glass of an optical part with the fingers because they leave fat upon the surface which is hard to clean. Clean the lens with lens paper and xylene.

It is well to start the examination with the low power lens, then turn to the high power objective. These objectives fit into a disk called the nose piece.

The specimen for examination is placed on a stage under the objective. Below this stage there is an iris condenser and a diaphragm with a mirror beneath to reflect the light. The need of the diaphragm is to restrict or concentrate the light to the specimen.

The microscope is not a difficult instrument to use, it takes time and patience. It seems to me it would be more difficult to practice if one did not have the use of a microscope, at least to make the correct diagnosis of intestinal and external parasites, but there are many other specimens which need the use of this instrument.

If the wife of a veterinarian will learn to use the microscope she will find this is one more way she can be a great help to her husband. She may not find the material her husband is looking for on the first slide, but if she will make a number of slides of each specimen for him to examine when he has time she will have earned her husbands gratitude for the time she has saved him. Perhaps there are no worm ova, no heart worms, no mange mites, but she will have prepared a fair sample. She will have to learn to use the microscope to prepare these slides.

In placing sections of a specimen on a slide care must be taken not to have too heavy a smear, yet enough for a fair test.

Another rule to follow is always use clean slides. That means slides free of any material that might cloud the glass or the lens. It is well to wash the glass first with running cold water, then clean with powdered bon ami, rinse well and clean with ether before using.

Again let me say, there is only one practitioner, the wife is the technician.

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This department will announce each issue new therapeutic items, equipment, services, and literature of interest to veterinarians. All claims made are those of the firms concerned. Send communications to the address noted.

Reader's Service

Your Meat Inspection Service is a 16 mm. sound, color movie that runs 27½ minutes. It graphically tells the story of those who guard the wholesomeness of our nation's meat supply and is available for loan from all cooperating film libraries, USDA; it is also for sale from United World Films, Inc., 1445 Park Avenue, New York 29, N. Y. Price $131.50.

A Meat-type Dog Food said by the manufacturer to offer three big improvements and the first new dog food packaging since moisture-packed foods were first canned in 1922 is now available as Chef Dog Food. It is packaged in 12 oz. rolls and may be fed

Landon Co.

by slicing through and peeling off the desired portion. In addition to the labor saving convenience of no cans, Chef requires no refrigeration, even for unfed portions of a roll. It is high in protein, added minerals and vitamin A, D_3, E and B_{12} plus a special scent factor. Palatability is said to be excellent. For more information, write Landon Company, Delavan, Wisconsin.

An Electroenhancement Screen has been developed that almost eliminates danger to patients from overexposure to *x*-rays, and at the same time makes it possible to have brighter images. The screen replaces the ordinary fluoroscope screen. The new screen has a retentive quality, which permits removal of the patient, *x*-ray equipment can be turned on with greater intensity than when the patient is present, to give a brighter image than the original. The new screen is being produced by Westinghouse.

Cosa-Terramycin Vet capsules designates the borad-spectrum antibiotic oxytetracycline hydrochloride with glucosamine, a natural metabolite that produces significantly higher serum levels of antibiotic activity. The product is indicated for treatment of animals with common infections caused by Terramycin susceptible organisms, including actinomycosis, calf diptheria, pneumonia, upper respiratory complications, and many others. The product is available through Chas. Pfizer & Co., 800 Second Avenue, New York 17, N. Y.

Greater Therapeutic Effectiveness against a wide range of infections through use of Penstrep (Merck) is described in a new folder issued by the manufacturer. Copies will be sent those who write Merck & Co., Inc., Chemical Division, Rahway, N. J.

NeoBOVOC designates a combination of two antibiotics, two sulfas, and an effective anesthetic as a pink-eye and wound dressing powder for cattle. It is recommended for treatment of irritations and infections of the eye, such as keratoconjunctivitis. It is supplied in a 10 gm. plastic squeeze bottle. For details check with Merck & Co., Rahway, N. J.

A Jumbo Garbage Can Liner made of thin wall polyethylene to fit the largest size 30 gallon garbage can is now available. Bags are greaseproof, odor tight. Bags are made

Klean Can Bag Co.

extra long to permit folding the top over the outside of the can. Samples are available from Klean Kan Bag Co., 64 East 8th Street, New York 3, N. Y.

A New Swine Erysipelas Vaccine named Duragen (Corn States) is now available to the profession. The vaccine is prepared from a strain of *Erysipelothrix rhusiopathiae* isolated and modified in Canada at the Connaught Medical Research Laboratories, University of Toronto. The strain gives immunity lasting at least six to nine months. The vaccine also protects against erysipelas arthritis, according to manufacturer's claims. For more information, ask Corn States Laboratories, 1124 Harney Street, Omaha 2, Nebraska.

A Guide to America's Dogs is an authoritative and up-to-the-minute chart with information on breeds, with origin, use, height, weight and other data pertinent to that breed. A copy of the Guide to America's Dogs may be obtained by sending $1. to the Gaines Dog Research Center, 250 Park Avenue, New York 17, New York.

Quatrasal Fungicidal Solution (Dome Chemicals) can be used by veterinarians in the treatment of ringworm infections and other fungus conditions, according to manufacturer's claims. For full information on Quatrasal Spray, write Dome Chemicals Inc., 109 West 64th Street, New York 23, New York.

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Wanted

WANTED: January, February, and September 1958 issues of VETERINARY MEDICINE. Your subscription will be advanced one month for each copy. Mail to VETERINARY MEDICINE, Suite 803 Livestock Exchange Bldg., Kansas City 2, Missouri.

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Kansas State College wants to buy all the identical twin, female dairy animals it can find within 300 or 400 miles of Manhattan or Mound Valley, Kansas. Those of milking age are preferred. The dairy cattle are to be used in research, so they must have no beef breeding and be true identical twins.

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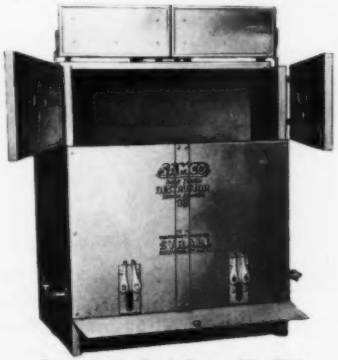

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Silent Partner Founder Succumbs

Peter N. Jans, whose career was closely united to the insurance problems of the veterinarian, died October 9, following complications following surgery. He was president and founder of Silent Partner Associates.

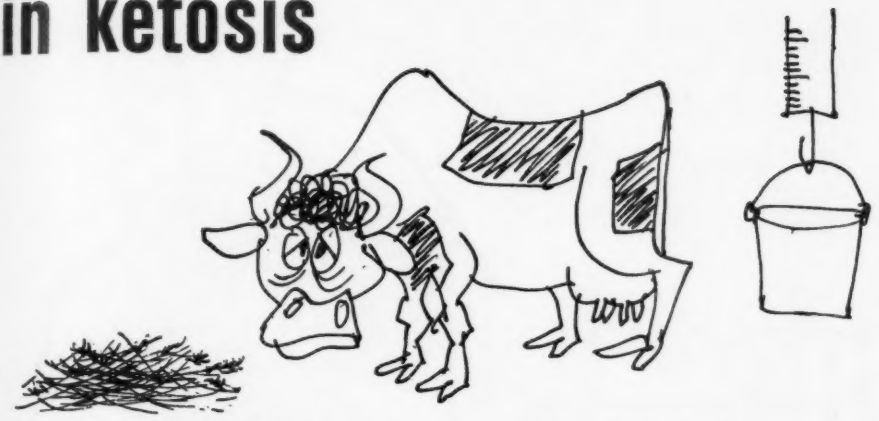
The Continental Casualty Company has announced that the untimely death of Pete Jans in no way affects any of the veterinary programs now in effect.

Doctor Seiden to Head Chemists

Dr. Rudolph Seiden, vice-president of Haver-Lockhart Laboratories of Kansas City, has been elected chairman of the newly-formed Midwest chapter of the American Institute of Chemists.

The chapter here is headquarters for a four state area which includes Kansas, Nebraska, Iowa and Missouri. Dr. Seiden said members of the chapter's 10 standing committees will be drawn from each of the four states.

in ketosis



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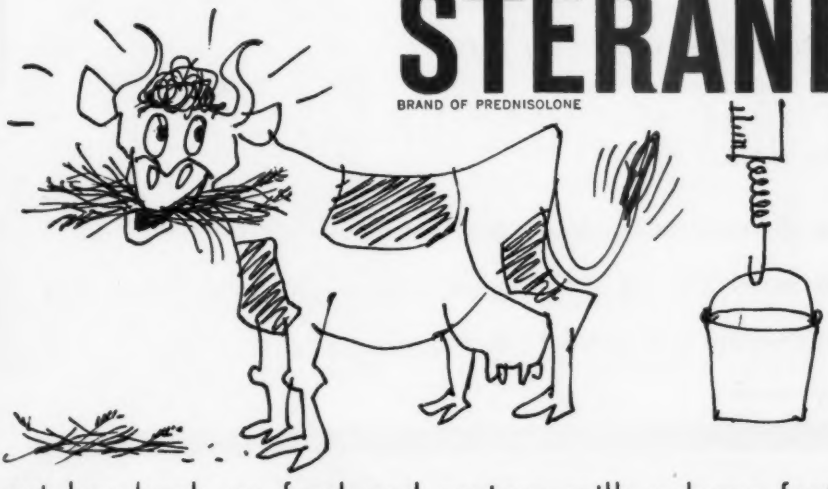

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SUPPLIED A water-miscible liquid of FURACIN 0.2% in polyethylene glycol and water. Single-dose SQUEEJET disposable dispenser of 30 cc. Still available, bottles of 500 cc. with rubber stopper and 1 gal.

1. Mires, M. H., and Chadwick, R. H.: Vet. News 10:3 (Jan.-Feb.) 1947. 2. Mires, M. H.: J. Am. Vet. M. Ass. 117:49 (July) 1950.

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- Balances the daily ration.
- Speeds recovery from illness.
- Shortens convalescence after surgery.
- Eliminates complicated additions to rations.
- Maintains health and vigor in older animals.
- Aids growth in young animals.

Dosage: 1 Pet-Tab daily.
Supplied: In bottles of 50. To veterinarians only.

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Fibreplex Kennels are superior one-piece molded fibreglass kennels, designed and engineered to the most exacting standards for modern use. Manufactured from selected resins and fibreglass for maximum strength, durability and utility, yet priced amazingly low.

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K. S. C. Launches Inspection Program

A program of state inspection of slaughtering and procesing of meats has been instituted in the new meats laboratory of the animal husbandry building at Kansas State College, Manhattan.

The inspection program has a two-fold purpose: it will protect the consuming public that purchases meat and meat products from the school laboratory, and instruct veterinary students in inspection procedures and technics used in commercial packing plants.

Sullivan Named to Schering Post

James E. Sullivan Jr. has been named Southern Division Manager of Veterinary Sales for Schering Corporation. Mr. Sullivan will be responsible for the employment, supervision and training of the company's veterinary sales representatives in the southern States.

CURTS

BOVIDOTE

CURTS

Laxative — Antacid — Detoxicant — Stimulant

(100% active ℞ ingredients)

Each pound contains: Anhydrous magnesium oxide (quantity sufficient to make 1 gallon of milk of magnesia) with a therapeutic dose (8 oz.) of sodium thiosulfate; plus sufficient quantity of tartar emetic and nux vomica for rumen stimulation

The original formula emphasizing the chemical detoxifying action of sodium thiosulfate together with its laxative action

DOSE: Adult cows 1 lb. suspended in 1 to 3 gallons water via stomach tube

OFTEN IMITATED — NEVER EQUALLED

PACKAGES: Carton of 12—1-lb. sealed polyethylene bags
25 lb. plastic lined fiber drums

order from your nearest CURTS distributor or direct

CURTS Laboratories, Inc.

Manufacturers of Veterinary Pharmaceuticals Since 1918

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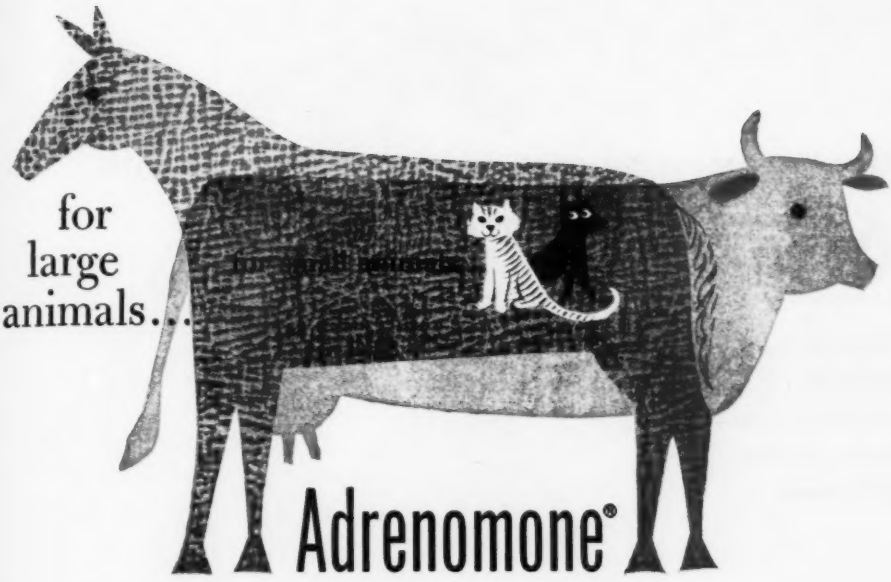

Adrenomone®

highly purified ACTH specifically designed and standardized for veterinary use

Specific for ketosis

- pronounced clinical improvement in uncomplicated ketosis within 24 to 48 hours
- credited with potentiating antibacterial drug action for earlier favorable response in ketosis complicated by secondary infectious processes

Beneficial for horses

- quick response in arthritis, laminitis, dermatoses and allergic manifestations
- relieves fatigue . . . especially important in treatment of neuromuscular diseases
- rapid objective and subjective improvement with relief of pain and establishment of a sense of well-being

Effective for small animals

- combats shock . . . relieves stress
- primary drug for ophthalmic disorders as conjunctivitis, uveitis, iritis, especially of allergic origin
- rapidly relieves itching and pain in allergic and nonspecific dermatoses resistant to other forms of therapy with improvement or recovery in a majority of cases

Safer for prolonged use

Adrenomone, unlike corticosteroid compounds, stimulates the entire adrenal cortex and thus may be used without danger of adrenocortical atrophy when extended therapy is desired.

Available in two strengths

40 I.U. per cc.
(200 International Units per vial)
60 I.U. per cc.
(600 International Units per vial)

Restricted to sale by or on the order of licensed veterinarians.

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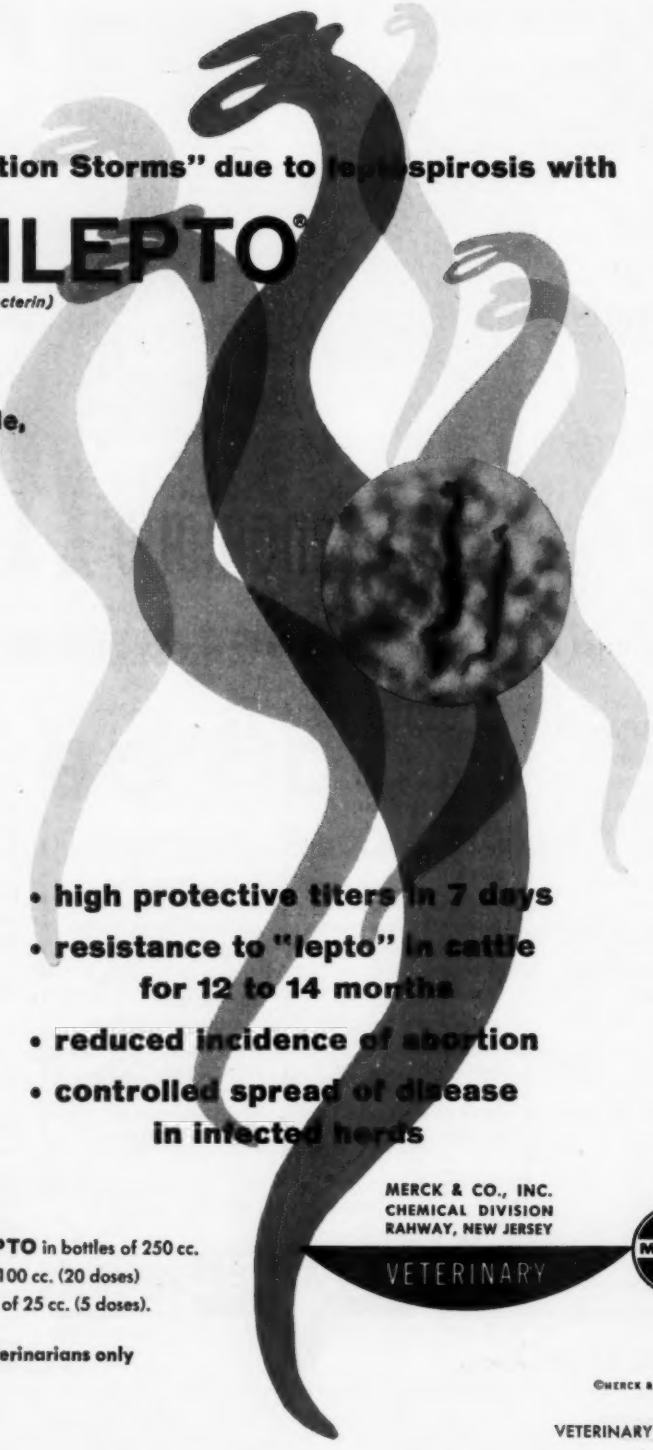
Stop "Abortion Storms" due to leptospirosis with

ANTILEPTO®

(Leptospira pomona bacterin)

Prevents and controls "lepto" in cattle, swine, horses and sheep



- **high protective titers in 7 days**
- **resistance to "lepto" in cattle for 12 to 14 months**
- **reduced incidence of abortion**
- **controlled spread of disease in infected herds**

MERCK & CO., INC.
CHEMICAL DIVISION
RAHWAY, NEW JERSEY

VETERINARY

MERCK

ANTILEPTO in bottles of 250 cc. (50 doses), 100 cc. (20 doses) and in vials of 25 cc. (5 doses).

Sold to veterinarians only

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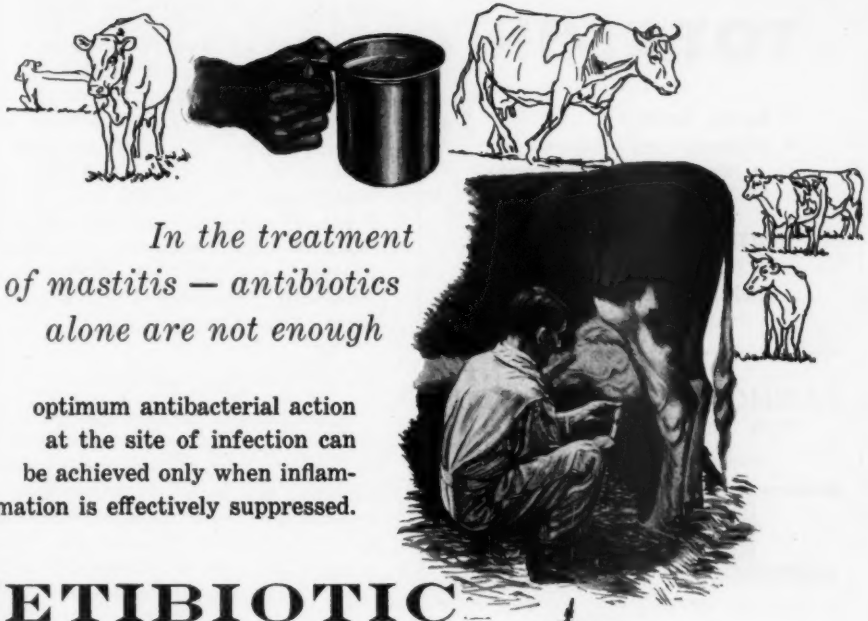

In the treatment of mastitis — antibiotics alone are not enough

optimum antibacterial action at the site of infection can be achieved only when inflammation is effectively suppressed.

METIBIOTIC

mastitis infusion

VETERINARY

combines the potent anti-inflammatory properties of METICORTEN Acetate and the broad-spectrum antibacterial activity of penicillin-dihydrostreptomycin for maximum therapeutic effect throughout the infected area. The danger of fibrosis and permanent injury to secretory tissue is markedly reduced by the specific anti-inflammatory action of METIBIOTIC in the udder.

Packaging: 7.5 cc. tube, boxes of 12, 72 and 144.

- *rapidly reduces inflammation*
- *quickly eradicates infection*
- *minimizes tissue damage*
- *restores normal milk production*

Schering

METICORTEN,® brand of prednisone.
METIBIOTIC,® brand of procaine penicillin-dihydrostreptomycin in oil with prednisone acetate.
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Antiseptic **Astringent**

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Compounded under the direction of veterinarians of exceptional experience. Highly recommended by leading herdsmen as the best treatment for the purpose.

Also mfrs. of LIQUID Dairmol Antiseptic and Deodorant.

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Wagner to Warren-Teed Post

Dr. Alan R. Wagner has been appointed to the scientific staff heading the newly formed pathology department at Warren-Teed Products, it was announced recently.

Dr. Wagner is a 1946 graduate of the College of Veterinary Medicine of Ohio State University. He has specialized in the fields of pathology and research with the State of Ohio Diagnostic Laboratories at Reynoldsburg and, more recently, with the American Cyanamid Company in Pearl River, New York.

USDA Officials Appointed

Appointments of veterinarians in charge of USDA animal disease eradication activities for several posts were announced recently. Dr. E. H. Norstrom was named to head the post at Lincoln, Nebraska; Dr. Robert L. Pyles at Albuquerque, New Mexico; and Dr. Grant E. Blake at Des Moines, Iowa. In these new assignments the veterinarians will be in charge of the cooperative animal disease control and eradication activities for the local department.

INJURED TEATS

SCAB TEATS

STENOSIS

POST-OPERATIVELY

To maintain unrestricted milk flow and provide medical antisepsis are of prime importance in treating teat troubles. Dr. Naylor Dilators accomplish these 2 objectives specifically with this 2-WAY ACTION:

1. MECHANICAL ACTION . . . gently supports sphincter and teat mucosa—keeps teat open and promotes easier, natural milking. Positive retention in small or large teats.
2. MEDICAL ACTION . . . *Sulfathiazole* released slowly from within the Dilator provides broad antimicrobial protection; combats infection and reduces swelling; minimizes ascending inflammation and promotes healing.

WITH ANTIBIOTICS . . . Saturated with your favorite udder infusion antibiotic, Dr. Naylor Dilators are an ideal vehicle for additional local medication following teat surgery.

Available from your ethical supplier or write Dept. "P"

H. W. NAYLOR CO., Morris, N. Y.

Dr. Naylor

Medicated Teat Dilators

SUPPLIED:

Dispensing vials—16's

Labled packages—45's

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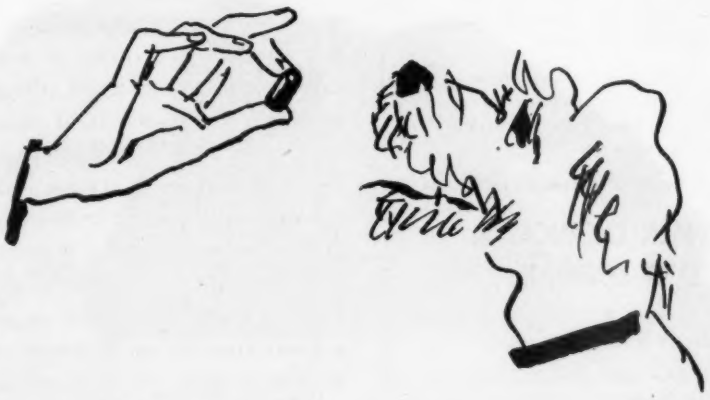
brand of nitrofurantoin

ORA-BOLS™

new, exclusive veterinary dosage form



■ pleasing taste
encourages prompt acceptance
■ tapered shape permits easy swallowing
■ readily retained

for small-animal urinary tract infections

FURADANTIN promptly produces high bactericidal concentrations in the urine; often there is marked improvement in a few days and complete recovery in 1-2 weeks.[1]

and canine tracheobronchitis

FURADANTIN administered for a period of 5 days effectively stopped coughing in 95% of 75 cases. In some instances symptoms were completely alleviated in 48 hours.[2] Recurrences have been very infrequent.

SUPPLIED: Bottle of 100 scored ORA-BOLS (50 mg. FURADANTIN with dextrose excipient). FURADANTIN VETERINARY also is available as: 10 mg. and 100 mg. bottles of 100 scored tablets and Oral Suspension containing 5 mg. per cc., bottle of 60 cc.

1. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 2. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

Available through your professional veterinary distributor.

NITROFURANS—a *new* class of antimicrobials—neither antibiotics nor sulfonamides

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"CAP-CHUR" EQUIPMENT

Automatic projectile type syringe delivered by a specially designed pneumatic rifle.

Excellent for immobilizing, capturing, restraining or treating wild or feral animals.

Effective for animals of all sizes. From one to ten milliters of any liquid compound can be injected into an animal from distances up to approx. 50 yards.

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These laboratories have been established to aid veterinarians in the diagnosis of obscure as well as common ailments in large and small animals. The chief aim of our staff is to give quick and accurate diagnosis at all times.

Our service includes fecal examinations, anti-biotic sensitivity tests, urinalyses, blood counts, tissue sections, bacteriological cultures, cultures for ringworm and blood chemistry. It is designed to assist owners and breeders of stock of all kinds including dogs, cats, horses, cattle, poultry, hogs and sheep.

Sample containers and price list on request.

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Telephone: LEhigh 5-9188

Deaths of Veterinarians

ROBERT C. BRAIL, MSC '52, at Reading Michigan, Sept. 5, 1958.

G. W. CLOSSON, KCV '05, 77, at San Gabriel, California, Sept. 3, 1958.

CLIVE DAILY, KSC '07, at Birmingham, Alabama, Sept. 2, 1958.

FRANK H. GEORGE, OSU '16, 65, at Plain City, Ohio, Sept. 11, 1958.

WILLIAM HEGENAUER JR., MSC '50, at Bridgeport, Mich., Aug. 28, 1958.

HOWARD C. HENDERSON, ISC '52, 30, at Henderson, Iowa, recently.

D. A. ILLINGWORTH, '04, 76, at Bennington, Vt., Sept. 3, 1958.

H. C. NICHOLS, OSU '17, 62, at Ocala, Florida, recently.

JAMES H. O'BRIEN, ONT '12, 70, at Taunton, Mass., July 29, 1958.

HOWARD F. PEGAN, ONT '97, at Cochranton, Pa., May 14, 1958.

PERCY E. PHILLIPS, KCV '15, 65, Winchendon, Mass., July 7, 1958.

CHARLES E. PRICE, SF '06, 81 Santa Ana, Calif., June 12, 1958.

L. FRANCIS REED, COR '13, 70 at Remsen, N. Y., Aug. 24, 1958.

JAMES R. RENFREW, GR '11, at Pasadena, Tex., July 13, 1958.

EDWARD R. RILEY, GWU '11, 84, at Nicoma Park, Okla., July 4, 1958.

ROBERT L. ROGERS JR., TEX '25, at Fort Worth, Texas, May 5, 1958.

F. SIDNEY ROOP, UP '96, Blacksburg, Va., Mar. 14, 1958.

BENJAMIN H. SAYRE ICV '08, 85, at Centerville, So. Dak., Aug. 27, 1958.

RALPH N. SEAMON, GA '56, 26, at Johnson City, Tenn., June 24, 1958.

LLOYD B. SHOLL, COR '23, 64, at Okemos, Mich., July 14, 1958.

LEE C. SMITH, KCV '08, 75, at Ventura, Calif., June 9, 1958.

WALTER E. STONE SR., MCK '16, 77, at Liberty, Mo., May 31, 1958.

DON B. STRICKLER, CVC '15, 65, at Houston, Texas, July 30, 1958.

GEORGE D. TUTTLE, CVC '10, 72, at Garwin, Iowa, June 19, 1958.

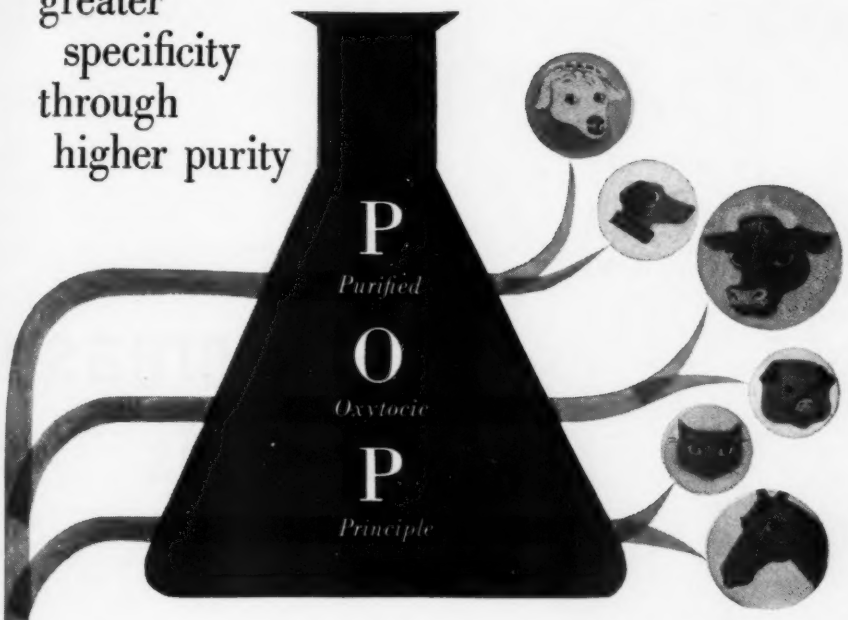
FRITZ VOLKMAR, OSU '31, 75, at Downey, Calif., April 4, 1958.

ROY M. WARE, OSU '47, 47, at Sidney, Ohio, June 9, 1958.

RALEIGH P. WIESE, CVC '17, 62, at Agrretson, So. Dak., June 17, 1958.

EMERY J. YOCOM SR., IND '10, 71, at Winamac, Ind., June 19, 1958.

greater specificity through higher purity



P.O.P. is a sterile aqueous solution of highly purified oxytocic principle of the posterior pituitary gland causing powerful rhythmic contractions of uterine muscle. This hormone also exerts a profound contracting effect on smooth muscle elements of the mammary gland to stimulate letdown of milk, and in management of mastitis to produce a hormonal debridement of inflamed milk ducts.

Superior potency—highest purity P. O. P. is double the potency of the official U.S.P. standards, offering 20 U.S.P. units of oxytocin per cc. And unlike standard posterior pituitary preparations, which are relatively unpurified mixtures of oxytocic and vasopressor principles, P.O.P. Armour is a highly purified oxytocic fraction with less than 0.4 units of pressor activity per cc.

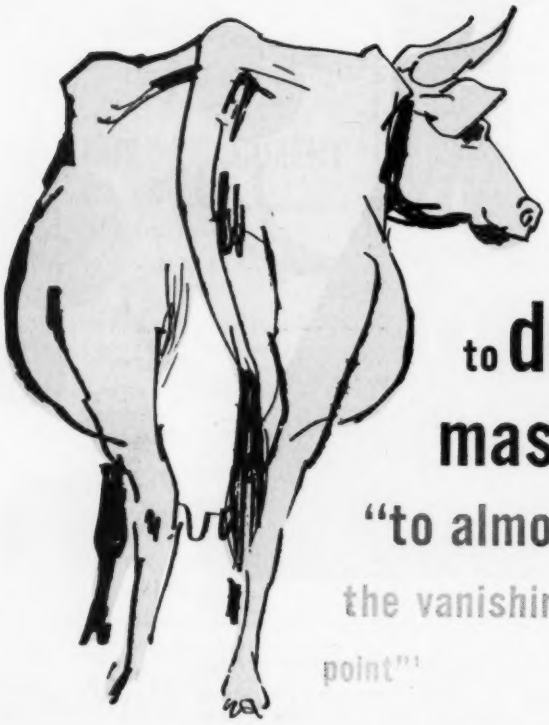
Used in obstetrical procedures for large and small animals, P.O.P. is an aid in management of precipitation of labor, postpartum evacuation of uterine debris, dysotcia due to uterine inertia and in uterine hemorrhage or prolapse.

In the treatment of mastitis P.O.P. promotes more efficient penetration of sulfonamides, antibiotics, enzymes or other agents for faster return of normal milk production . . . in many cases within 24 hours.

Supplied in 10 cc. and 30 cc. multiple dose vials.

Restricted to sale by or on the order of licensed veterinarians.

ARMOUR *Veterinary Laboratories, Kankakee, Illinois*



to decrease mastitis "to almost the vanishing point"[1]

FURACIN®-PENICILLIN GEL *veterinary*

Furacin with penicillin produces an enhanced antibacterial action that is at least additive, and may be truly synergistic. The combination covers a broader bacterial spectrum of gram-positive and gram-negative organisms than either agent alone.

Indications: For treatment of bovine mastitis caused by Staphylococcus aureus; Streptococcus agalactiae and dysgalactiae; Escherichia coli and Pseudomonas aeruginosa sensitive to Furacin.

For use as a topical ointment in treatment of wounds, pyodermas, in otic and ophthalmic infections.

SUPPLIED: A crystalline suspension of Furacin 2% and procaine penicillin G (13,333 units per cc.) in peanut oil with aluminum stearate 3%. In rubber-capped vial of 100 cc.; applicator tube of 7.5 cc., box of 12.

1. Kakavas, J. C., et al.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951.

NITROFURANS—a *new* class of antimicrobials—neither antibiotics nor sulfonamides

EATON LABORATORIES, NORWICH, NEW YORK

All Eaton Veterinary Specialties Are Available Through Your Professional Veterinary Distributor

Veterinary Calendar

Jan. 7-9. **New York State Veterinary College,** Cornell, 51st annual conference for veterinarians. Cornell University, Ithaca, New York. W. A. Hagan, dean.

Jan. 13-15. **Kansas Veterinary Medical Association,** 55th annual convention. Hotel Broadview, Wichita, Kansas. Dr. K. Maynard Curts, 5236 Delmar Ave., Kansas City 3, Kansas.

Jan. 14-16. **Indiana Veterinary Medical Association.** Hotel Severin, Indianapolis, Ind. Dr. L. M. Borst, 3315 Shelby Street, Indianapolis, Ind., secretary.

Jan. 18-19. **American Animal Hospital Association,** Region 2, annual meeting. Atlanta Biltmore Hotel, Atlanta, Georgia. Dr. R. P. Knowles, 2101 N. W. 25th Ave., Miami, Florida.

Jan. 21. **American College of Veterinary Toxicologists.** Hotel Utah, Salt Lake City, Utah. Dr. William F. Harris, 1102 East Main Street, Puyallup, Washington, secretary-treasurer.

Jan. 21-22. **Michigan State University,** 36th annual postgraduate conference for Veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Mich. Dr. W. W. Armistead, dean.

Jan. 26-28. **Minnesota State Veterinary Medical Society,** annual meeting. Leamington Hotel, Minneapolis, Minn. Dr. B. S. Pomeroy, secretary-treasurer.

Jan. 27-28. **Maryland State Veterinary Medical Association.** Winter Meeting. Emerson Hotel, Baltimore, Maryland. Dr. Harry L. Schultz Jr., Baltimore, Md., secretary.

Jan. 28-29. **North Carolina State College Veterinary Conference,** North Carolina State College, Raleigh, North Carolina. Dr. Edward G. Batte, head, Veterinary Section.

Feb. 2-4. **California Veterinary Medical Association,** annual Midwinter Conference. School of Veterinary Medicine, University of California, Davis.

Feb. 8-9. **West Virginia Veterinary Medical Association,** winter meeting. Greenbrier Hotel, White Sulphur Springs, West Virginia. Dr. Harry J. Fallon, 200 Fifth Street West, Huntington West Virginia, secretary.

Feb. 14-15. **Short Course in Bull Evaluation.** Glover Veterinary Hospital, College of Veterinary Medicine, Colorado State University, Fort Collins, Colorado. Dr. O. R. Adams, chairman.

Feb. 16-18. **Colorado State University,** 20th annual conference for Veterinarians. Glover Veterinary Hospital, College of Veterinary Medicine, Colorado State University, Fort Collins, Colorado. Dr. O. R. Adams, chairman.

Feb. 16-18. **Illinois State Veterinary Medical Association,** annual meeting. LaSalle Hotel, Chicago, Ill. Dr. C. B. Hostetler, 1385 Whitcomb Avenue, Des Plaines, Ill., executive secretary.

How would YOU diagnose this?

CASE NO. 6 Study of radiograph in this case revealed subluxation of both femurs with coexistent flattening of the femoral heads. Diagnosis: congenital hip dysplasia.

To relieve pain and inflammation in such cases, the product of choice is Butazolidin® (Veterinary).* Butazolidin is a dramatically effective new nonhormonal antiarthritic drug that promptly relieves inflammation and pain, reduces fever, yet is relatively free from serious side effects associated with hormones commonly used in such cases. Use Butazolidin in your next case involving musculoskeletal disorders.

*Brand of phenylbutazone under license from Geigy Chemical Corporation, U. S. Pat. No. 2,562,830.

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Kansas City, Missouri

continued from inside front cover, small animal section

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Single Bottle.....$2.00
3 and 1 free.....5.00
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12 and 4 free.....17.00
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NEW 1959 EDITION

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Feb. 25. **Nutrition Conference for Veterinarians.** Public Health Building, Indianapolis, Indiana. (Jointly sponsored by the Indiana Veterinary Medical Association and Vita Vet Laboratories, Marion, Indiana.) Dr. J. M. Carter, 3421 S. Main Street, Elkhart, Indiana, chairman.

Feb. 26-28. **Missouri Veterinary Medical Association** annual meeting. Hotel Statler, St. Louis, Missouri. Dr. Paul L. Spencer, P. O. Box 2[illegible] Jefferson City, Missouri, secretary.

Mar. 2-6. **Laboratory Diagnostic Methods in Veterinary Mycology,** short course. Communicable Disease Center, Public Health Service, Chamblee, Georgia. Dr. William Kaplan, Mycology Unit., Department of Health, Education and Welfare, P. O. Box 185, Chamblee, Georgia.

Apr. 13-14. **Oklahoma Conference for Veterinarians.** College of Veterinary Medicine, Oklahoma State University, Veterinary Medical Center. Dr. John H. Venable, chairman.

Iowa Veterinarians Honor Members

Members of the Eastern Iowa Veterinary Medical Association honored two of their colleagues for outstanding service in the veterinary profession at the 45th annual meeting recently. Elected to life time membership in the association were Dr. William S. O'Brien and Dr. Iva Dunn.

tested medicinals direct by mail

10cc Procaine Penicillin — Aqueous Suspension 300,000 Units per cc Standard Brand Expires February 1960	10 Vials	$ 3.10
	100 Vials	28.95
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10cc Procaine Penicillin — 400,000 Units with ½ gm. Dihydrostreptomycin in each 2 cc Aqueous Suspension Standard Brand Expires September 1959	10 Vials	6.35
	100 Vials	58.00
	1000 Vials	560.00
1 Vial — Penicillin G Powder — 500,000 Units each Standard Brand Expires March 1960	10 Vials	1.60
	100 Vials	15.00
	1000 Vials	140.00
10cc Dihydrostreptomycin Solution — ½ gm. per cc Standard Brand Expires November 1962	10 Vials	6.25
	100 Vials	57.00
	1000 Vials	550.00
5gm. Dihydrostreptomycin Powder Expires April 1960	10 Vials	6.25
	100 Vials	57.00
	1000 Vials	550.00
Tetracycline Capsules 250mg Standard Brand Expires 1961	100	22.49
	5x100	110.00

Penicillin Tablets — Soluble — 100,000 Units	100	1.45
	1000	12.00
	5000	53.00
Penicillin Tablets — Soluble — 200,000 Units	100	2.50
	1000	22.00
	5000	104.00
Penicillin with Triple Sulfas — 300,000 Units	100	4.95
	1000	47.50
5cc Acth-Gel — 40 units per cc Standard Brands	1 Vial	2.65
	10 Vials	24.50
	100 Vials	235.00
5cc Acth-Gel — 80 units per cc Standard Brands	1 Vial	4.95
	10 Vials	46.00
	100 Vials	440.00
Prednisone or Prednisolone — 5mg — Specify	100	4.90
	1000	43.00
	5000	205.00
10cc Vitamin B_{12} — 1000 MCG per cc Crystalline — U.S.P.	1 Vial	2.25
	10 Vials	21.00
	100 Vials	200.00
	1000 Vials	1900.00

Minimum Shipping Order $25.00. Postage prepaid. Check with order.

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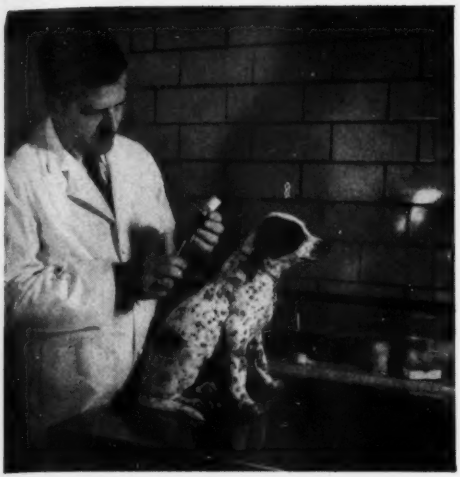
nationally known antibiotics, therapeutics, hormones, biologicals, vitamins and pharmaceuticals for all animals



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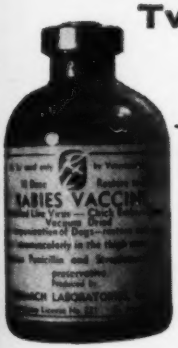
in the control of Rabies

Two Proven Rabies Biologicals Veterinarians Depend on



RL Rabies Vaccine (Modified Live Virus Chick Embryo Origin)

- Produces high-degree immunity which has lasted in field test beyond 3 years.
- Vacuum dried for safety.
- Vaccine reconstitutes immediately upon introduction of the diluent.
- Rigidly tested for moisture, sterility, safety, and potency.
- RL products are sold only to graduate veterinarians.

RL Rabies Vaccine

Modified live virus, chick embryo origin, vacuum dried. Available in 5—1 dose vials (3 cc. dose), 100 pks. of 5—1 dose vials, and 1—30 cc. 10 dose vial.

RL Rabies Vaccine (Phenolized—20% Tissue Suspension)

- For administration in routine yearly vaccination of pets and/or after exposure to the disease.
- A finely ground homogenous suspension of brain and spinal cord from sheep and goats previously inoculated with Fixed Rabies Virus, National Institute P.V. I. of Health Strain.
- Chemically inactivated with Phenol.
- RL products are sold only to graduate veterinarians.

RL Rabies Vaccine

Phenolized—20% tissue suspension. Available in 6—5 cc. single dose, 1—50 cc. multiple dose, 10—50 cc. multiple dose, and 10 pks. of 10—50 cc. multiple dose vials.

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Saint Joseph, Missouri

DOCTOR...MASTITIS CONTROL

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So that you may be better acquainted with the **MERITS** of our Accuracy Attested — The KO-EX-7 Brom Thymol Mastitis Detectors with the green spots which tell the Degree or Severity of the infection, we will gladly mail you a full sized box FREE upon request. Write today.

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OCUROL-VET

The pinkeye medicine of choice among leading veterinarians around the world. Order from your favorite veterinary distributor.

THE OCUROL-VET COMPANY ★ SABINAL, TEXAS

Missouri Advisory Committee Formed

An Advisory Committee for the School of Veterinary Medicine at the University of Missouri was formed during the annual Short Course for Veterinarians sponsored by the Missouri Veterinary Medical Association and the School of Veterinary Medicine, October 6-7.

The new Committee will be composed of Dr. F. D. Gentry, Springfield, chairman; Dr. A. H. Quin, Kansas City, vice-chairman; Dr. G. T. Barrows, Macon, secretary. Other members are L. N. Atkinson, Kirkwood; Paul Spencer; L. A. Rosner; E. R. Price; all of Jefferson City; W. R. Sheets, Farmington; and J. C. McCrae, Platt City.

One of the first tasks to be undertaken by the committee will be a study of the curriculum at the School.

This move was prompted by the growing realization that changing trends in the veterinary profession demand definitive action at the effective level. The Committee will assume its new duties immediately.

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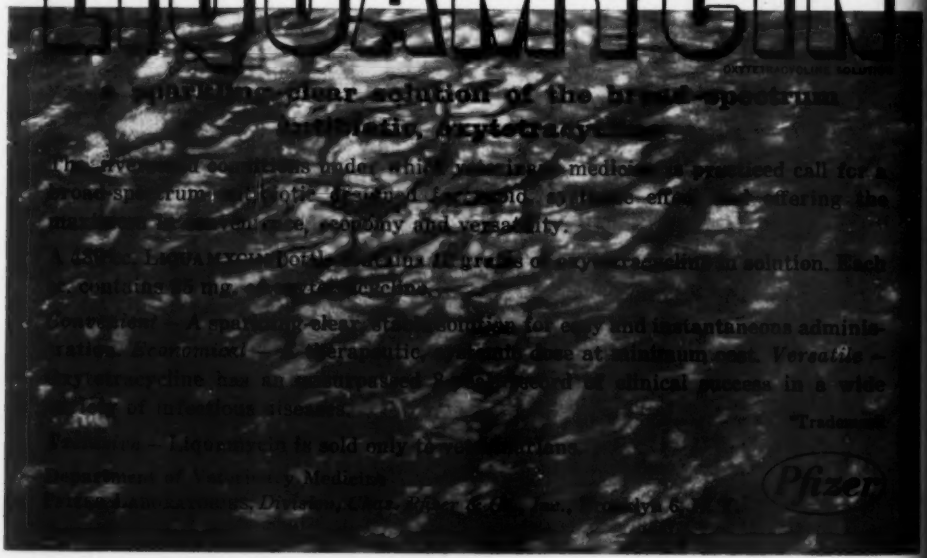

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1. Harris, J.R., and Clarkson, T.B., Prevention of Relapses in Milk Fever, Vet. Medicine, *12*:696 (Dec. 1955)

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